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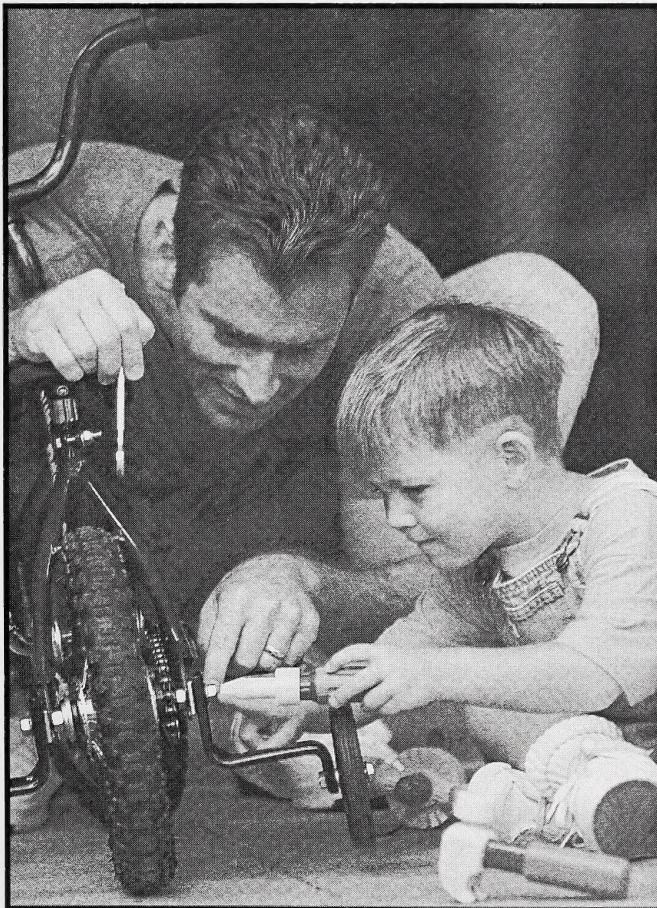
# Home Instructor's Manual



Distance  
Learning



# Grade One Mathematics Home Instructor's Manual



## This product is the result of a joint venture with the following contributors:



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This document is intended for	
Students	
Teachers	
Administrators	
Home Instructors	✓
General Public	
Other	

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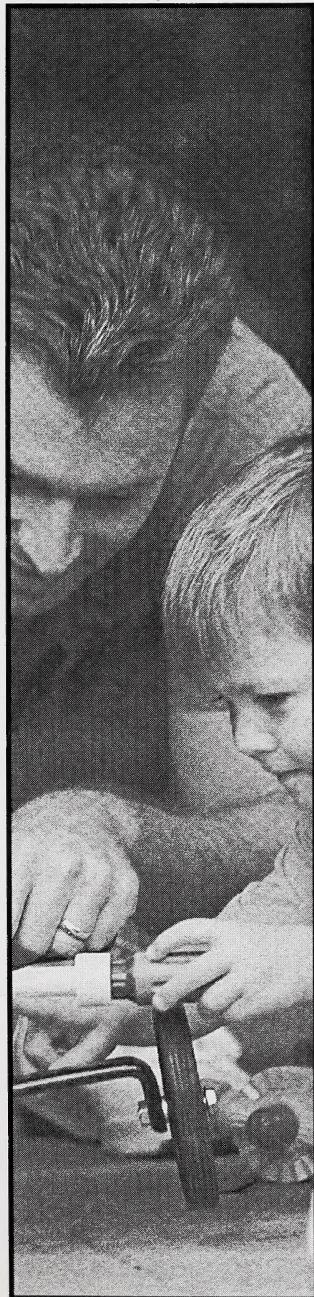
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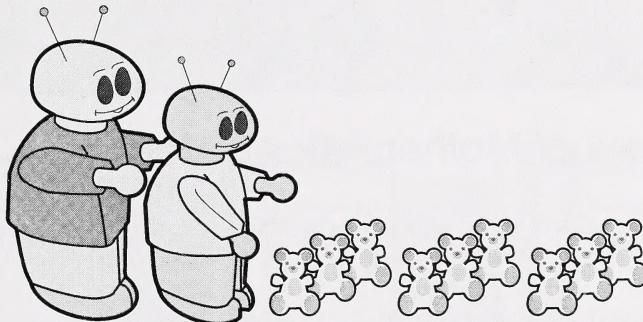


# Introduction

Welcome to the Home Instructor's Manual for Grade One Mathematics.

Review this manual **before** you begin the lessons, because it will help you understand the program and enhance your student's educational experience.

If you have questions or concerns while reading this manual or progressing through the modules, contact your assigned teacher or the home education supervisor in your local school jurisdiction. You could fill in the form below in order to have this information available as you go through the program with your student.



## How to Make Contact

Name of School or Jurisdiction \_\_\_\_\_

Phone Number .....

Mailing Address .....

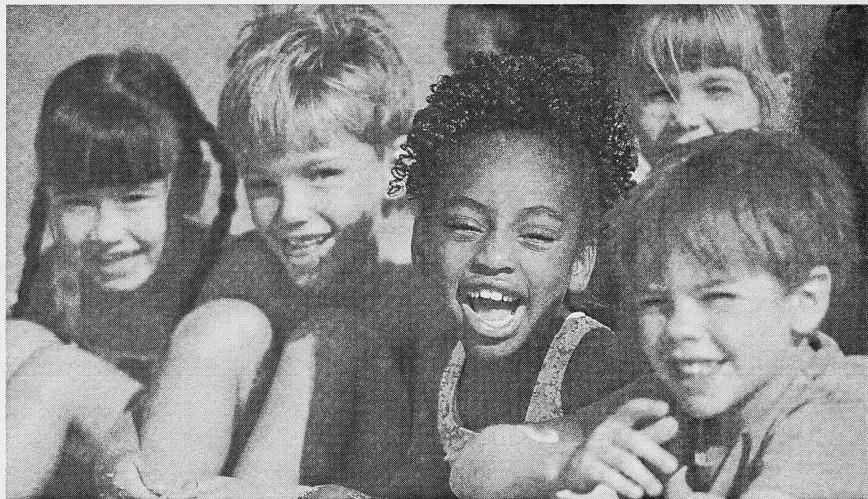
Fax Number .....

E-mail Address .....

Hours of Operation .....

Home Education Supervisor ....

Teacher .....



## Overview of Mathematics Education

The overall goals of mathematics education are to prepare students to do the following:

- confidently use mathematics to solve problems
- communicate and reason mathematically
- appreciate and value mathematics
- commit to lifelong learning
- become mathematically literate adults
- use mathematics to contribute to society

## Overview of the Grade One Mathematics Program

This Grade One Mathematics program is based on the Western Canadian Protocol mathematics curriculum, which is mandatory in Alberta.

### Grade One Mathematics Program Goals

At the completion of this program, the student should have developed a positive attitude toward mathematics and have basic knowledge and skills related to all four topics from the course.

- Number Concepts and Operations
- Patterns and Relations
- Shape and Space
- Statistics and Probability

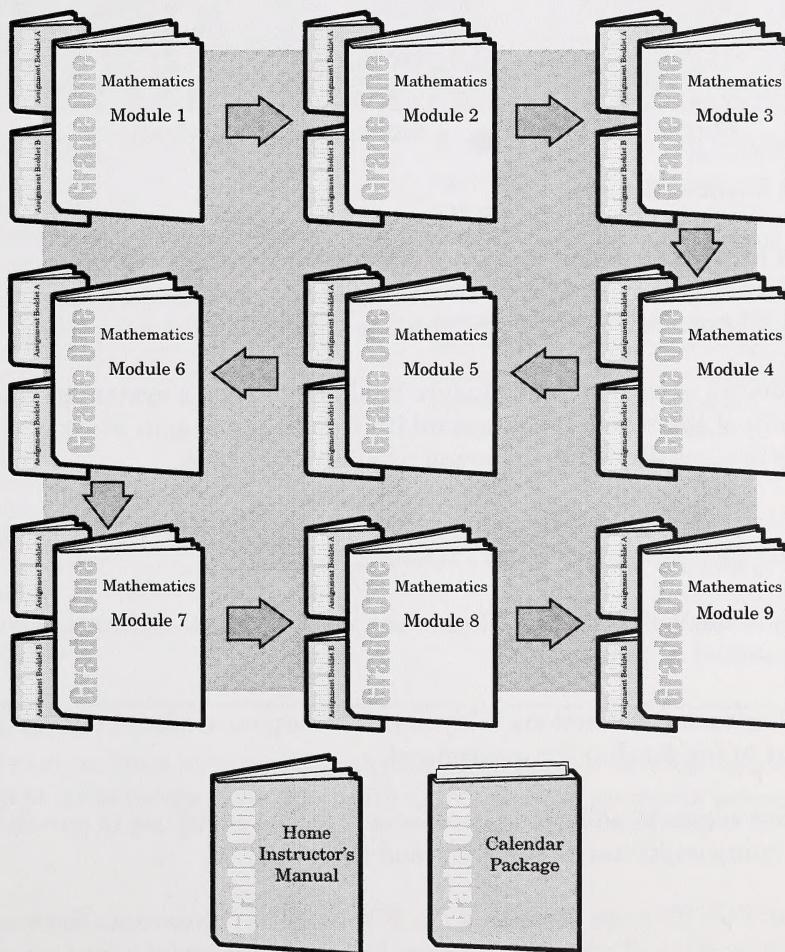
In addition, problem-solving skills are integrated with all four topics.

# All About Grade One Mathematics

## How the Program is Designed

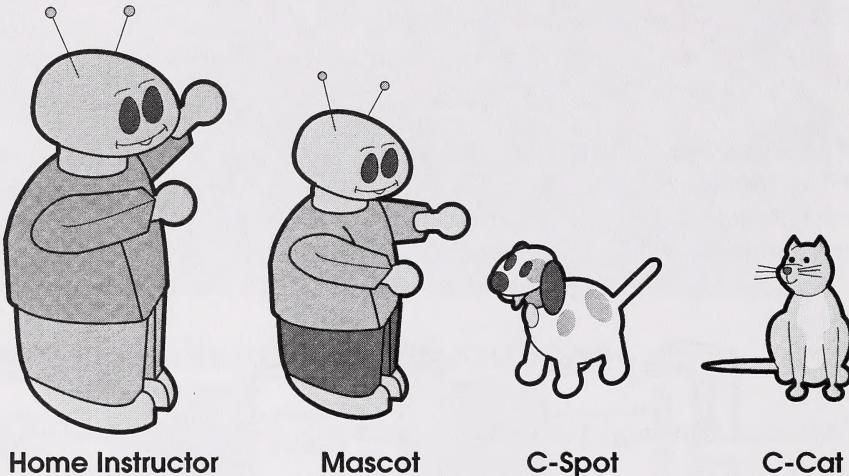
The program package involves several other parts in addition to this Home Instructor's Manual. A survey of the components will show you that there is a Calendar Package and that the program is divided into nine segments of learning called modules. For each module, there are three print elements: one Student Module Booklet and two Assignment Booklets.

If your student is enrolled in the entire Grade One Mathematics program, begin with Module 1. Otherwise, begin with the module that has been recommended for your student. In either case, proceed with subsequent modules in order until the program is completed with Module 9.



## The Program Characters

Throughout the program, you will see many characters involved in activities that illustrate the mathematical concepts. Introduce these four main characters to your student before you begin the Student Module Booklets and Assignment Booklets.



## Student Module Booklets

Student Module Booklets contain guided activities that will take you through the Grade One Mathematics program and show you, step by step, what to do with the student. These activities will prepare the student for the assignments.

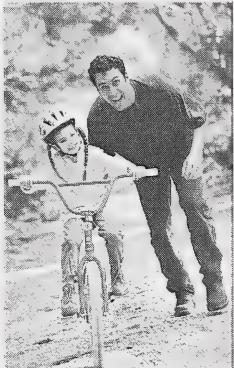
The structure of the Student Module Booklets follows a systematic design. Overviews of the whole program and its visual icons begin every module. A table of contents then outlines the following preliminary pages:

- A Module Overview introduces the module topics and includes an outline of the main elements of each day's lesson.
- A Module Web Chart highlights the mathematical concepts and skills that are presented in that module.
- Submission instructions tell you how to organize student assignments to be sent to the teacher for assessment.
- A list suggests additional resources that you could use to enrich the student's learning opportunities in that module.
- The "SPICE" page (Teaching the Whole Child) illustrates the five aspects of early childhood education to keep in mind while working as a home instructor: **Social, Physical, Intellectual, Creative, and Emotional**.

The body of the Student Module Booklet is made up of 18 daily lesson plans. Each daily lesson plan contains student activities that develop skills and knowledge centred around particular topics, called Focus for Today.

The activities may involve various **thinking strategies**, such as those that follow.

## Thinking Strategies



### Exploring

examining  
extending  
calculating  
estimating  
visualizing  
reading  
measuring  
predicting  
experimenting  
listening  
recognizing  
brainstorming  
associating  
discovering  
inventing  
imagining  
challenging  
manipulating

### Organizing

dividing  
arranging  
rearranging  
ordering  
sequencing  
webbing  
sorting  
matching  
recording  
tallying  
modelling  
connecting  
charting  
diagramming  
patterning  
classifying  
symbolizing  
surveying  
graphing

### Assessing

justifying  
testing  
concluding  
writing  
interpreting  
explaining  
verifying  
questioning  
inferring  
reasoning  
comparing  
summarizing

### Applying

predicting  
discovering  
generalizing  
telling  
elaborating  
role-playing  
displaying  
investigating  
observing  
discussing  
reasoning  
writing  
illustrating  
reading  
describing  
demonstrating  
constructing

Each day also includes optional Enrichment activities in case the student needs extra help or a challenge. This flexibility caters to each student's personal situation.

## Assignment Booklets

With each Student Module Booklet are two Assignment Booklets—one for Days 1–9 and another for Days 10–18. The activities in the Assignment Booklets can be used by the teacher to assess your student’s understanding of the mathematical concepts in the modules. The student should complete these assignments daily after you have completed the related module materials together. Submit each Assignment Booklet and its related items to the teacher for marking at the time the teacher has requested them. The teacher will let you know when to provide each item for marking. Do not keep back Assignment Booklets to be submitted in groups.

It is important to submit assignments regularly in order to do the following:

- record a current evaluation of the student’s progress
- identify strengths and weaknesses
- solve problems as they arise

## The Role of the Home Instructor

Using the structure of this Grade One Mathematics program and guidance from a teacher, you, the home instructor, will have the important role of encouraging and challenging your student to become actively involved in the study of mathematics. In order for this active learning to take place, you will need to set up a rich learning environment. Think in terms of “immersion.” Your student’s environment should not only support learning but also invite and stimulate exploration and discovery. Before beginning each day’s activities, let your student informally explore the materials that will be used in a structured way during the lesson.

## Arrange the Learning Area

Where will your student work? It should be a quiet area with no distractions. You might choose the kitchen or the student’s room, or you may have the luxury of a spare bedroom that you could turn into a learning area. It is desirable to have a bookcase, chalkboard or whiteboard, desk or table to work on, and bulletin board for student work and learning charts. The side of a refrigerator makes an ideal bulletin board. Proper lighting and comfortable seating are essential. Keep all supplies handy in your work area.

## Use Organizational Tools

Use baskets, plastic pails, filing cabinets, storage chests, and other containers to store required materials. For example, you could use colour-coded containers for different manipulatives. The more organized you are, the more time you will have for learning activities. Any effort you invest in setting up and maintaining the learning environment will serve you well.

## Make a Time Commitment

A well-managed home school begins with a commitment to planning. Long-range planning, weekly goal setting, and day-to-day decision making will help you gain confidence. Involve your student in the planning as well in order to encourage the following in the child:

- a sense of direction
- increased self-confidence
- commitment to the program, goal setting, and improvement

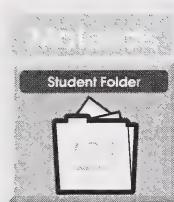
On a weekly basis, spend approximately two hours preparing lessons, organizing the week's schedule, and planning extra activities, such as a field trip to the library. Begin by scheduling how you and the student plan to comfortably complete this program. Some families find home schooling year-round suits them, and others like to take traditional school breaks.

You do not have to follow a traditional school schedule. You could set daily or activity goals instead. Do not let unmet goals discourage you. You will get more accomplished by setting goals and not meeting all of them than by not setting goals at all.

If you are presenting all the Grade One subjects to your student, set a definite time period for each subject or activity. Suggested times to work on calendar activities and lessons are stated, but you can adjust them to meet your student's needs. Do not let single subjects or activities go on indefinitely. After completing one activity, give the student a short break before proceeding to the next activity. The important thing is to maintain a comfortable and consistent routine. This includes having a set bedtime and rising time for your student during the school year.



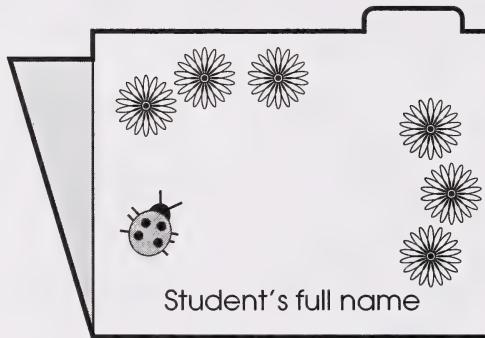
## Prepare a Student Folder



Most of the assignments are in the two Assignment Booklets that accompany each module. However, the student will complete other projects as well. Whenever you see this icon, place these other assignments in a Student Folder. Store projects there until the time comes to submit them as the teacher has indicated.

The Student Folder is not provided for you.

To create one, you can use a box, a commercial file folder that the student has decorated and labelled, or a folder made from heavy-weight paper. Only the contents are submitted to the teacher, not the Student Folder itself.



## Send Module Assignments to the Teacher

On Day 9 and Day 18 of each module, you will find a checklist in the Assignment Booklet to help you compile items for submission to the child's teacher. Follow the directions that accompany this checklist. The teacher will let you know the submission schedule that has been outlined by your school.

When the Assignment Booklet and other items are returned to you, read all teaching notes, explain them to the student, and act on them if necessary. Focus on the student's strengths, and support the student in areas of weakness. Help the student set, monitor, and maintain improvement goals.

After the student's assignments have been reviewed, place them in a binder or other suitable organizer for future reference. You will see growth in mathematics by comparing present work with previous submissions. Give the student specific praise for effort and improvement that is apparent in ongoing work.

## Collect Manipulatives

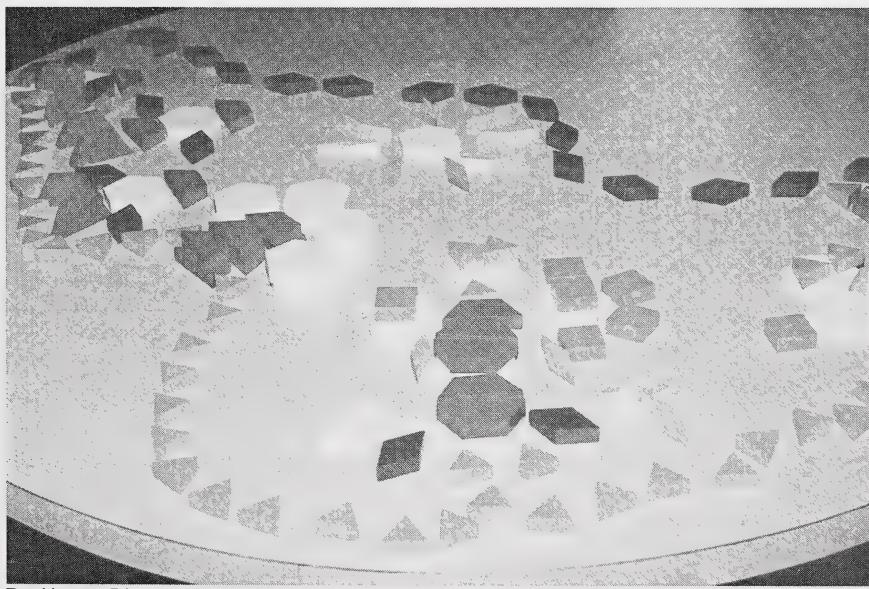
Manipulatives are small, practical items such as cards, blocks, and counters that children can handle in order to learn reasoning and mathematical concepts.

Throughout the Grade One Mathematics program, the use of manipulatives is encouraged so that different learning styles and developmental stages of the student are addressed.

The basic components of this Grade One Mathematics program are provided for you, except for wooden **Pattern Blocks**, which can be purchased through the Learning Resources Distributing Centre. It is highly recommended that you have a set of these blocks available for your student, but a temporary set could be made from the cards that you will find in the Appendix of this Home Instructor's Manual. Other required manipulatives could also be purchased, or they could be found in the home or easily made.

The following manipulatives are available from the Learning Resources Distributing Centre, or LRDC, in Edmonton. If you live in Alberta, call the province-wide, toll-free number 310-0000 and then enter 427-5775. You can phone Monday through Friday from 8:15 A.M. to 4:30 P.M.

- Cube-a-links interlocking cubes, product order number 161894
- Geometric Solids, product order number 161977-01
- Pattern Blocks, product order number 161901



Pattern Blocks

## Gather Basic Supplies

Certain basic supplies are required on a regular basis throughout the Grade One Mathematics program. Prepare a box containing these materials, and keep it in your work area for use during the program.



## Master List of Required Materials

- HB pencils
- eraser
- various colours of wax crayons, pencil crayons, and felt markers
- chalkboard and chalk or whiteboard and dry-erase pen
- safety scissors
- glue stick and white glue
- ruler
- stapler
- file folders
- paper clips
- masking tape (narrow and wide) and transparent tape
- tempera paint and various sizes of brushes
- binders for returned assignments
- magazines and catalogues that can be cut up
- various sizes of envelopes and containers for holding items
- stars, stickers, stamps, and stamp pad
- clear, self-adhesive vinyl
- calculator
- paper of various types and sizes
  - lined and unlined loose-leaf paper
  - construction paper
  - manila paper
  - drawing paper
  - painting paper
  - cardboard (new or recycled)
  - unlined index cards, 13 centimetres by 8 centimetres

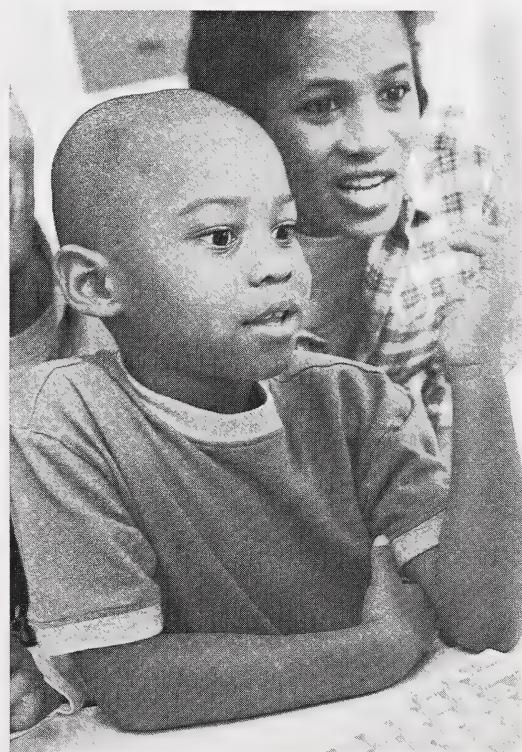
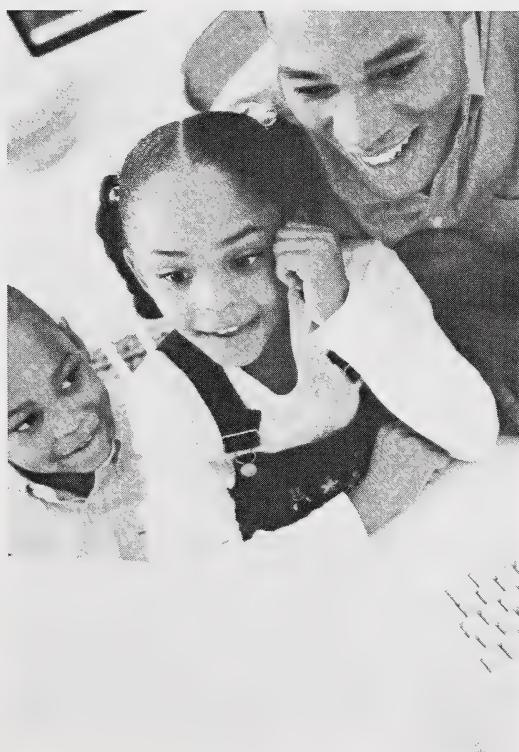
In addition to the supplies on this master list, you will need other supplies such as manipulatives that vary on a daily basis. Refer to the list called Materials Required at the start of each day's lesson.

## How the Computer Can Help You

If you already own a computer or are interested in purchasing one, this section will tell how a computer can enhance your student's learning. When provided with basic knowledge, a typical Grade One child loves to explore and play on a computer. Without basic knowledge, the student may become frustrated or bored or do damage to the computer.

When you have access to a computer, begin to develop your student's knowledge by teaching how to do the following:

- Turn the computer on and off.
- Access a word-processing program, software program, or the Internet.
- Position the keyboard, mouse, or other input devices.
- Perform simple tasks, for example, use a word-processing program to print the numbers to ten.
- Use the **space bar** and the **enter** key.



## Looking for Software

Computer software is constantly changing. Updated versions are released every few months, so it is advisable to do the following:

- Buy the latest version of any program.
- Investigate thoroughly before you buy.
- Talk to other people about what they find useful and why.
- Ask if stores will allow you to preview sample copies of a program before purchase so you can assess the value for your own purposes.
- Keep in mind that most software companies are American. Be prepared to deal with variations such as systems of measurement.

## Surfing the Net

Much fun and learning begin when you and the student venture beyond your desktop into the world of the Internet, or cyberspace.

### The Importance of Adequate Access

For convenience, you could find a server with a local connect number that provides approximately 100 hours of access to the Internet for a flat monthly fee and uses Netscape Navigator or Microsoft Explorer as a browser. A **browser** is software that lets you use the Internet.

### Search Engines

The volume of information on the Internet is growing daily, so it is necessary to use a search engine to find the information you need. A search engine is a program that retrieves information or files from the Internet. Some examples of search engines are *AltaVista*, *Lycos*, *Infoseek*, and *excite*. You can enter a word, such as *measurement*, and the search engine will list websites that match your word. You can then choose the ones you want to look at.

### Things You Might Not Like about the Internet

There are disadvantages to cyberspace. A major one is that undesirable sites can be hidden in innocent places. Consequently, it is important for you to monitor the sites your student is accessing. A second concern is that “surfing the net” is time consuming. Even with the fastest equipment and latest software, it could be difficult to find a website that best suits your needs.

## Educational Sites

If you already have access to the Internet, listed below are some sites that could enhance your student's learning of mathematics. Remember that exploring these references is optional, and be aware that these addresses are subject to change.

**<http://www.funbrain.com/kidscenter.html>**

**<http://www.math.com/parents/specialneeds.html>**

**<http://www.math.com/parents/articles/childlearn.html>**

**<http://www.math.com/parents/articles/domath.html>**

**<http://www.math.com/parents/articles/intro.html>**

**<http://www.math.com/parents/articles/mathgo.html>**

**<http://www.math.com/parents/helpyourkids.html>**

**<http://www.math.com/parents/articles/mathlook.html>**

**<http://www.math.com/parents/articles/funmath.html>**

## How the Student Can Benefit from a Word-Processing Program

At the Grade One level, it is generally advisable to have a student use the mouse rather than the keyboard alone. Keyboarding before the child is developmentally ready or has learned proper techniques could foster the "hunt and peck" method of keyboarding. One way to develop good keyboarding skills is a software program called *JumpStart Typing*. This is produced by Knowledge Adventure, Inc., Glendale, California. One version was produced in 1997. If this program is not available, check for other possibilities.

Your Grade One student could use a word-processing program for mathematics by learning where the number keys are located on the keyboard. The student could then use these numbers to practise skills such as number concepts, number operations, and patterns. A drawing component would enable the student to do math activities such as showing object patterns and drawing objects to match a given number.

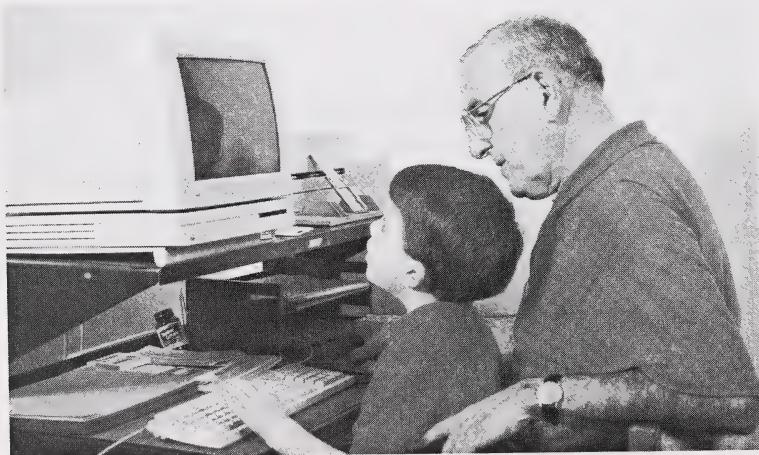




## Buying a Computer

Do as much research as possible before purchasing a computer.

- Talk to people who already have a computer. Discuss what they like about their computers, any problems they have had, and whether they would do anything differently if buying another computer.
- Read about computers. For example, *Consumer Guide* magazine is a good source of information.
- Use a computer at a library or friend's house.
- Shop around, and ask lots of questions.
- Listen to or watch computer talk shows.



# Student Assessment

**Curriculum** describes what students are expected to learn. A range of assessment tools (for example, assignments, activity samples, self-evaluations, and learning logs) will help you gather information on your student’s ability to understand and apply curriculum skills and concepts. Through conversations and written comments, the teacher will provide an evaluation of your student as a developing learner. A subject letter grade will relate your student’s performance to curriculum standards.

Have the student work carefully. If your student is having difficulty, reread the appropriate teaching information and have the student review the activity or assignment. Review all work with the student before submitting it to the teacher. Focus on any errors, and have the student make necessary corrections. This provides remediation while the concept or skill is still fresh in the student’s mind.

Comment in the daily Learning Log on any corrections that your student makes.

Contact the teacher for the following specific assessment information:

- How is grading affected if work is missing, incomplete, or incorrect?
- Can work be corrected and resubmitted?
- Can marks be adjusted if work is corrected and resubmitted?
- When do report cards come out?
- Is it possible to discuss the student’s work in person or by telephone?
- Who else receives reports of the student’s progress, for example, a local school principal or superintendent?
- What are the requirements for promotion to a higher grade?

# Development and Learning in the Early Years

## Teaching the Whole Child

One of the most important constants for humans is that all aspects of development—**social, physical, intellectual, creative, and emotional**—are interrelated. Each area influences and is influenced by all other areas. This concept is illustrated in the “SPICE” page that appears at the beginning of every module.



Because these areas of growth cannot be neatly separated into parts, failure to attend to all aspects of a student’s development can cause learning problems. For example, the connection between emotion and learning is becoming increasingly clear from research on brain development and memory. While negative emotional situations may interfere with learning, activities with positive emotional connection can make learning more meaningful and memorable.

Following are general descriptions of widely held expectations for the social, physical, intellectual, creative, and emotional development of five-to-seven-year-old children.

## Social Development

### Relationship to Adults

At this stage, children especially need praise, warmth, patience, guidance, and success. They want adults to listen to their points of view, and they enjoy imitating adults. Reasonable rules and structure help provide security and foster children's trust in the adults that are in charge.



### Relationship to Peers

Most children at this age are becoming increasingly interested in peers, especially same-gender playmates. They are more capable of sharing, playing co-operative, rule-regulated games, and following the rules. During this time, children usually develop their first reciprocal ("give and take") friendships.

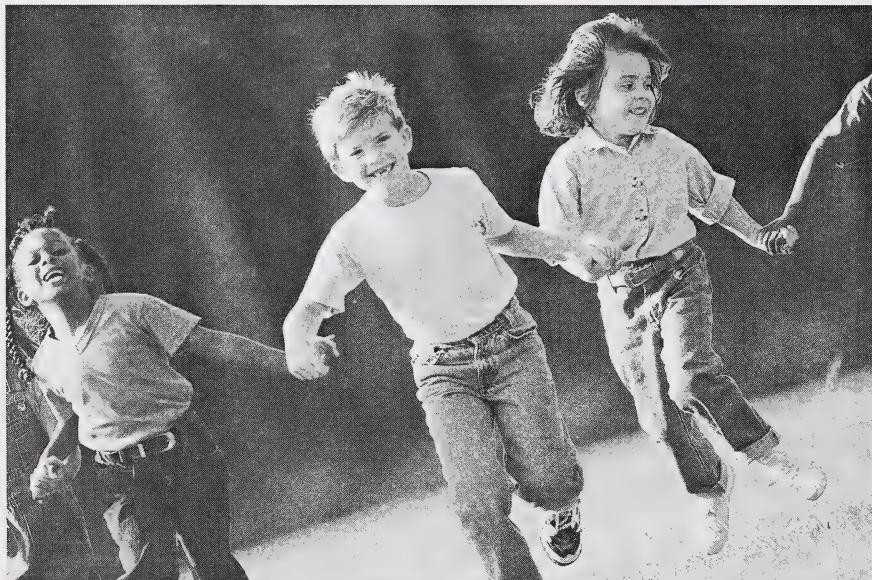


## Physical Development

The brain and spinal cord are maturing; consequently, skills such as reading and writing are advancing. Wrist and finger bones are also growing, allowing more precise handling of materials. Drawings begin to show recognizable shapes as part of a whole picture. Printing, a complex process, takes longer to learn. Left- or right-hand preference is established for some children at this age. Others show no hand preference.

The senses of sight, hearing, smell, taste, and feeling are coming along rapidly and are at various levels. Hearing is not fully developed, causing children to have some difficulty distinguishing and remembering sounds. Co-ordination of eyes and other senses continues to evolve. Generally at this age, children are naturally far-sighted. Sustained, close work could injure the nervous system and cause muscular disorders, vision defects, and attitudinal problems.

Physical growth and greater body co-ordination contribute to an increased ability to control movements such as running, jumping, and balancing. These factors also increase the ability to sequence a series of movement skills, such as for somersaults. Large muscles, especially in boys, are becoming stronger and more mature. Boys may be faster and more skilful at athletics, whereas girls generally are better at fine-motor skills, such as printing and cutting. Both boys and girls have high energy levels, but they tire easily.



## Intellectual Development

Six- and seven-year-olds build on the important developments of their first years of life and seem to settle down to a steadier pace of growth and learning. They begin to be able to think about and solve a wide range of problems. This milestone in intellectual ability has important implications for every area of development. For example, children at play engage in games with rules, because they now can understand and consistently apply them. Likewise, their language use becomes more complex, partly because they understand that one word can have multiple meanings. In the social-emotional area, the newfound intellectual ability of these children has important implications for their thinking processes and developing understanding of self.



Children aged six and seven are usually interested in real-life tasks and problem solving. They generally have longer attention spans and are more likely to stick with things until a project is finished, a problem solved, or an argument resolved.

During this phase, children learn to shift their focus from appearance to logic; for example, they begin to understand that the volume of a liquid in a container doesn't change when the same amount is placed in a different-sized container.

An understanding of number and one-to-one correspondence is also developing. For example, children are beginning to realize that the number of objects—seven, for instance—does not change when the objects are rearranged, distributed, or divided into different subsets such as  $5 + 2$  and  $6 + 1$ .

Children in this age group are becoming aware that new actions can undo previous actions; for example, they can balance a scale by adding or taking away weights.



Concepts of time and space are improving but still not mature. Not until about age eight are children reasonably accurate in placing events in sequence. Symbols such as words and numbers can be used to represent objects. It is still very important to relate hands-on materials to these symbols whenever possible.

Children at this age typically master the ability to place objects in order by length, weight, or size. This type of ordering requires the ability to hold two pieces of information simultaneously—noting that an object is both larger than one object and smaller than another. At first these children may judge length on the basis of how far one end extends without considering the starting point; for example, a child might consider line B longer.

A \_\_\_\_\_  
B \_\_\_\_\_

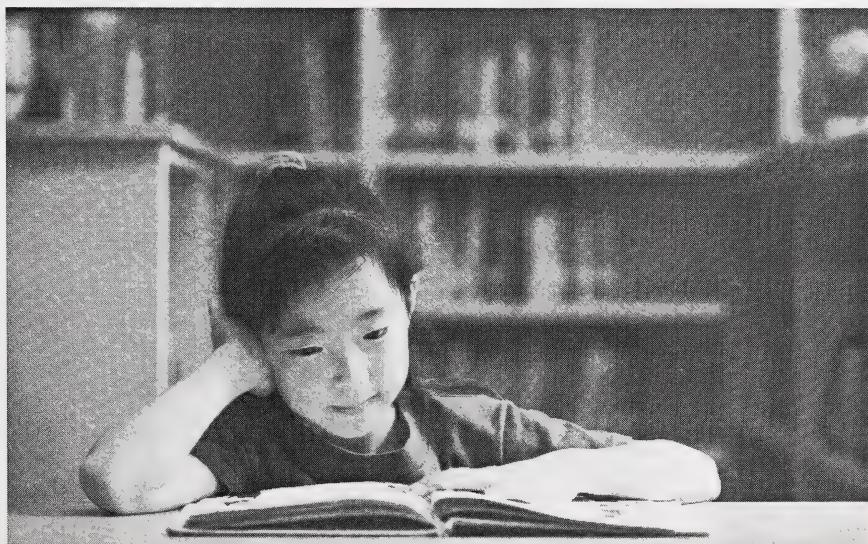
The ability to group objects by common attributes gradually extends to the ability to classify using more than one attribute at once and to understand that one object can be a member of more than one group at a time. Six- and seven-year-old children can usually sort blocks by colour, shape, function, and size.

Children at this developmental level learn by changing things with awareness and intent. They like to select, combine, and show initiative. Touch and movement are very important to learning, but thought does not always come before action. Plans may be made ahead of time and carried out, or they may evolve during an activity.

From ages six to seven, children show improved ability in short- and long-term memory. A child's foundation of knowledge and concepts contributes to improved memory and connects to new information and experiences. Memory is still largely associated with personal experiences. Adults can encourage the use of memory strategies, such as connecting information to personal interests, looking for patterns, and repeating information.

Changes in language and communication capacity are closely tied to intellectual development. Vocabulary increases by reading as well as by listening, and expressive vocabulary expands from spoken to written communication. Speech becomes more social and less child centred. Speaking and listening vocabulary usually doubles during this time. Language is used to clarify, direct, report, imagine, reason, predict, project, and maintain self. Since language skills are still developing, incorrect grammar, sentence structure, and word usage are common. It is usually best not to correct a child's language errors directly. Instead, use a more child-friendly method, such as repeating the question in its correct form as part of the answer. At this age, children like to ask many *how* and *why* questions about their physical world. Sometimes, the meaning of speech is clear to the child but not to the listener.

While in this stage, children try to match print to their own flow of language. They acquire reading skills through observation and instruction on terms such as *left to right, down, across, front, and back*. They are developing an interest in dictating stories and recalling the meaning of stories without focusing on the printed word. Instead, they use pictures, knowledge of the situation, and knowledge of the story structure to recall meaning. A sight vocabulary, or words that the student knows by sight, begins to emerge. Children learn to sort words by significant features and to read stories using meaning, sentence structure, and the sounds of letters. A variety of printed material is useful to create personal reading strategies.



## Creative Development

Creativity is a way of thinking. It appears in almost all aspects of life, from the way a parent calms an angry child to the way a dancer moves to interpret music.

Most school-age children are learning to solve a wide range of problems, so this age is ideal to foster creative thinking. Teachers and parents can do the following to help children learn to think and solve problems creatively:

- Encourage children to think and act without adult direction but within the limit of reasonable rules.
- Give children opportunities to try ideas and make mistakes.
- Model the consideration of several solutions for any one problem.
- Challenge students to consider various solutions by allowing expression of ideas with no fear of negative response.
- Give children opportunities to make choices and engage in “imaginative play.”
- Immerse children in stimulating environments.
- Encourage children’s sense of accomplishment through activities such as building models, cooking, creating stories and artwork, and playing music.
- Help children explore their world by taking field trips to museums, work places, and other neighbourhoods.
- Constructively evaluate students’ work so children become aware of things they do well and some things they need to improve.



## Emotional Development

Intellectual growth between ages five and seven affects not only children's understanding of other people but also their understanding of self. While preschool children typically describe themselves in terms of their behaviours, for example, "I went to the zoo," school-age children form academic, social, and physical images of themselves. At about age eight, these images combine into a general image of self.

At this age, children are generally more predictable, independent, self-controlled, and self-confident than preschoolers; they are also very concerned with satisfying their own needs.

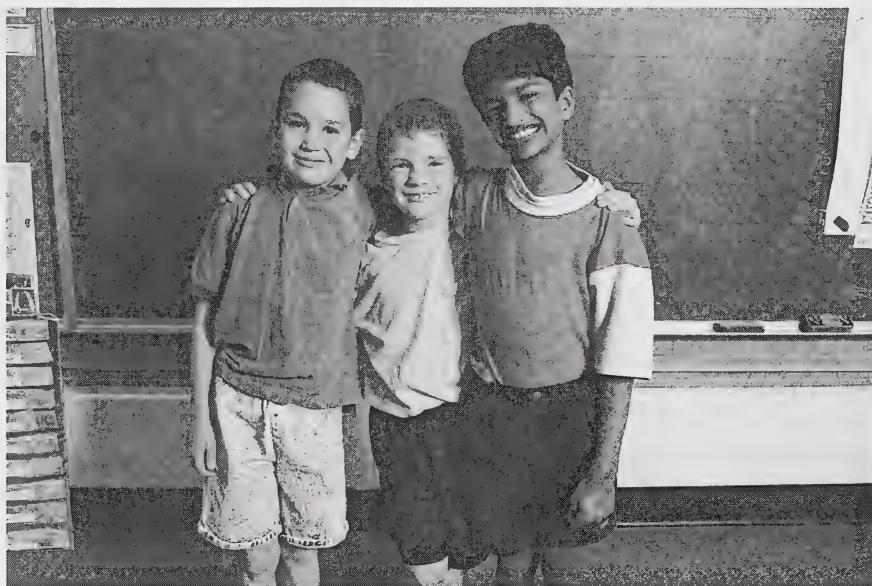
One of their needs is to seek a sense of security in groups, organized play, clubs, and friendships. They begin to play with one another, rather than beside each other. Being with friends, especially ones of the same gender, becomes increasingly important. The ability to see things from another child's viewpoint is beginning to develop. School-age children use language to describe their feelings. Self-concept is influenced by how others feel toward them. At approximately age seven, these children begin to understand that others don't always feel the same way they do.

During this stage of development, children generally view things as black and white, right or wrong, wonderful or terrible, with very little middle ground. There is a strong desire to do things well and to do things right. Criticism or failure is difficult to handle.



It is critical for children to develop a sense of competence. They need the knowledge and skills recognized as important by their culture, especially social, literacy, and numeracy skills. A large body of research provides powerful evidence that children who fail to develop minimal social competence and who experience rejection or neglect by peers are at significant risk of dropping out of school, delinquency, and mental-health problems. The challenge for adults is to build on children's strong motivation for mastery, without breaking their spirits.

At this time of life, children usually start to accept their own strengths and shortcomings and to make social comparisons. Such information becomes part of children's self-concept and can affect their motivation. Unfortunately, when adults encourage competition and comparison, they lessen children's optimism and their own abilities and opportunities for the future, and this hampers motivation. Experiences that cause children to have negative self-images can seriously influence their behaviour, which in turn affects their interactions with peers.



# Special Needs

The following list of early-warning signs can help you recognize whether your student could develop a learning problem. If you check any of the items on the list, consult your doctor or the local school jurisdiction. Fortunately, many developmental delays and handicapping conditions can be helped or completely corrected if home instructors recognize the problem and seek professional help as soon as possible.

Observe your student for any of the following characteristics.

## Seeing

- does not look at toys or people and try to reach for them
- frequently rubs the eyes
- has red, watering, or encrusted eyes
- sometimes or always crosses one or both eyes
- squints



## Hearing

- does not startle at loud noises
- does not turn to face sounds and noises
- has frequent earaches, running ears, or running nose
- does not understand spoken conversation or directions
- talks in an unusually low voice

## Talking

- does not talk in sentences
- has difficulty expressing ideas
- stutters

## Moving

- is unable to sit long enough to complete a task
- is unable to run, kick a ball, and hop on one foot

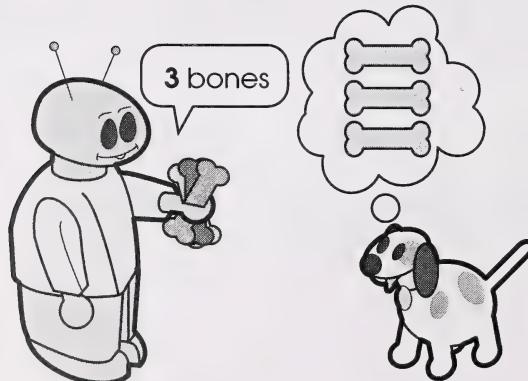


## Mathematical Knowledge That Students Need

Which is more important, mathematical **skills or concepts**? For many years, this question has been debated, but the fact is that knowledge of both is necessary for success in mathematics. Educators must first understand the difference between skills and concepts and then help students make connections between them.

The **development of skills** often involves learning rules and step-by-step procedures.

The **understanding of concepts** requires thinking about relationships, making connections, and fitting new learning with previous learning.



# How Students Learn Mathematics

How does a child learn mathematics? This important question has no simple answer.

Research has consistently shown that mathematics must make sense to a person in order to be understood and retained. Mathematics is a discipline with order, structure, relationships, and problem-solving applications.

Consequently, this Grade One Mathematics program has made every effort to do the following:

- involve the student in meaningful mathematical situations that proceed from the simple to the more complex
- emphasize the application of mathematics
- include a broad range of appropriate content and material, for example, manipulatives
- make appropriate and ongoing use of technology

The manipulatives used throughout this program are to accommodate diverse learning styles and developmental stages. They will also help the student form personal meaning and applied mathematical concepts. See Additional Resources in the modules for manipulative ideas.



# Applying Mathematics

Effective mathematics instruction must consider how children learn. The practical teaching applications that follow are based on a blend of research, teaching experience, and thinking about how children learn mathematics.

## Application 1: Actively Involve Students

The following Chinese proverb tells about the importance of active involvement.

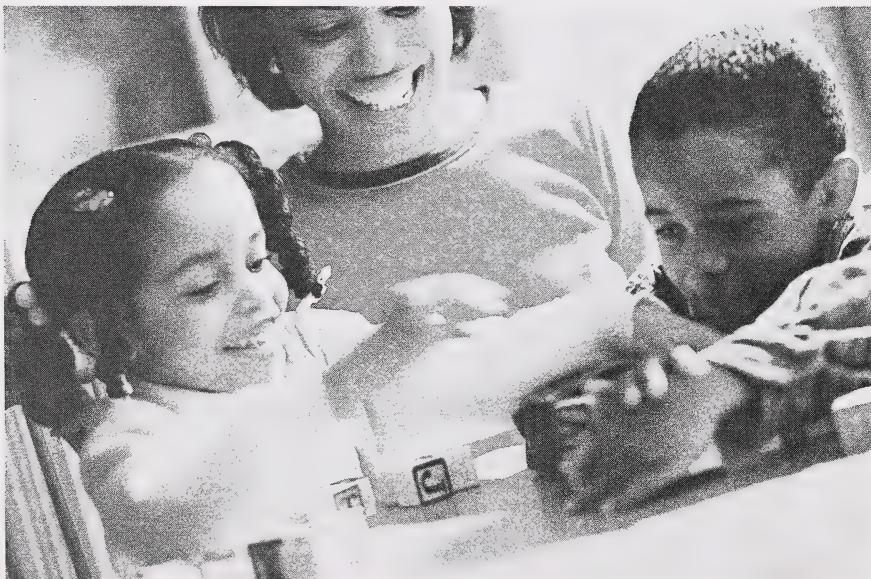
I hear and I forget;  
I see and I remember;  
I do and I understand.

This principle can take place in many ways, such as interaction between home instructor and student, hands-on experience with manipulatives, and use of special learning tools such as a calculator and computer.

## Application 2: Relate Learning to Development

Most students learn best when mathematical topics are appropriate for their developmental level and presented in an enjoyable and interesting way.

The teacher, the program, and you as the home instructor all play critical roles in setting up a developmentally appropriate, enjoyable, and interesting environment in which the student can explore mathematics.

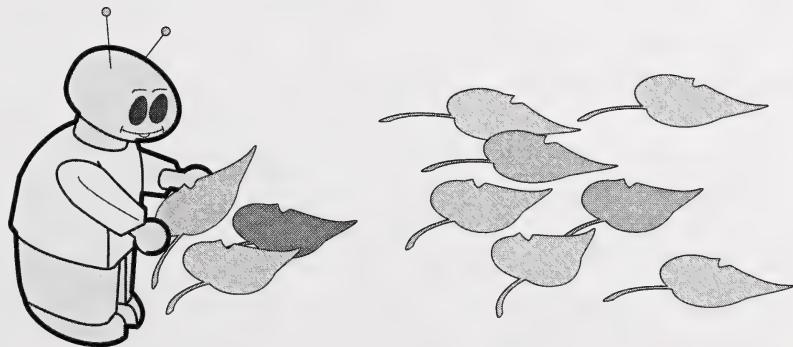




### **Application 3: Incorporate and Build on Previous Learning**

This mathematics program is organized to guide the student through continued but increasingly advanced study of related topics.

You, the home instructor, can enhance the program by linking the student's personal environment and background knowledge to the learning process.



## Application 4: Think, Talk, Write, and Listen

Models, manipulatives, and real-world examples provide many opportunities for your student to think, talk, write, and listen. Just as speaking comes before writing, so should the oral language of mathematics precede use of its written symbols.

To receive valuable insights into children's thinking and understanding, listen to them explain, justify, and share strategies. With this knowledge, instruction can be individualized to meet specific needs. You can help your student express ideas by "thinking aloud" when you solve problems.

Encourage **effective listening skills** by doing the following:

- Observe mathematical situations and talk about them.
- Read aloud and talk about books that deal with mathematical concepts.
- Make up mathematical stories and discuss them.
- Model good listening habits, such as asking questions and not interrupting.

Encourage **clear speech** with the following techniques:

- Speak in simple, complete sentences.
- Talk about activities you are doing with the student.
- Use new words in correct situations.
- Provide personal experiences for the student to discuss.
- Play number games, such as *Snakes and Ladders*.
- Encourage the student to express reactions to daily situations.
- Accept the student's spoken words without correcting.
- Provide a good model for correct speech.

Encourage **good communication** with your student as follows:

- Seek opportunities to talk and write about daily events.
- Use a friendly tone of voice when speaking.
- Avoid nagging or judgemental statements.
- Use language the student will understand.
- Discuss topics that interest the student.



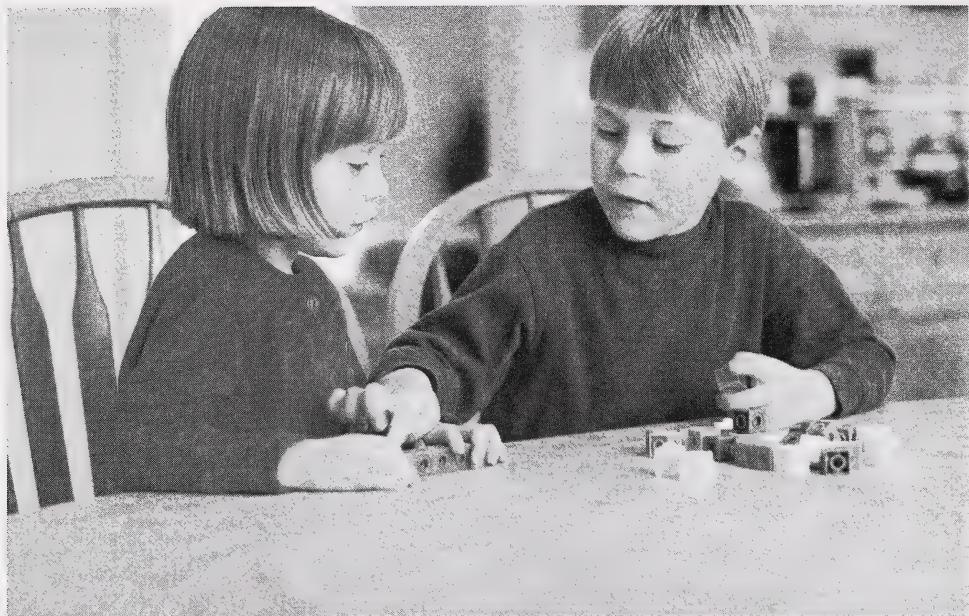
## Application 5: Ask Questions

Questions are an important component of the learning process when they encourage critical thinking, establish relationships, and promote meaningful connections.

Following are some question-and-response techniques that have been found to aid learning:

- Use open questions or prompts, such as those that follow:
  - Why?
  - What do you think?
  - Explain what you are thinking.
- Follow a closed question such as *What was your answer?* with an open question such as *How did you decide?*
- Stimulate thinking with questions, such as the following:
  - Suppose ...?
  - What if ...?
  - I wonder ...?
- Use silence as a tool. Give the student some time to think about the question.
- Listen carefully to the student's responses. Decide when to help, for example, by giving further guidance, or when to let the student continue thinking about the question.
- Listen and watch for situations where a question could reduce frustration, keep the student on task, or further the student's understanding of a concept.





## Application 6: Use Models, Manipulatives, and Real-World Examples

Manipulative materials, models, and real-world examples play a critical role in learning mathematical skills and concepts. For example, when developing the concept of a circle, you could use a plate to illustrate what a circular shape actually looks like.

The student might focus on irrelevant details such as the decorative pattern on a plate unless attention is drawn to a specific feature. For example, you could use a felt marker to outline the shape of the plate and then talk about that shape.

Other real-world examples you could introduce are included below.



## Application 7: Think about Thinking

You can challenge students to “think about their thinking” as another important component of mathematics learning. Examples of this are knowing that practice improves learning and that manipulatives or drawings can help understanding.

The following instructional strategies could be used to help students become more aware of their thinking:

- Emphasize meaning and understanding, rather than memorization, by guiding the student to make connections among concrete models, skills, and concepts.
- Talk aloud and model problem-solving strategies, rather than simply presenting a solution, and encourage the student to do the same.
- Ask questions, such as those that follow:
  - Why did you do that?
  - How did you know not to use that information?
  - Why did you decide to estimate?
- Discuss how problems can be solved in different ways.
- Encourage students to tell what they think about mathematics. For example, you could begin with the following questions:
  - What do you like, and why?
  - What do you dislike, and why?



## Application 8: Share Interest and Enthusiasm for Mathematics

If you enjoy instructing and share your interest and enthusiasm for mathematics, your student will more than likely be motivated and successful. One important way to motivate your student is by **not** using statements such as “I was never any good at math,” or “I still can’t balance my chequebook.” The irony is, even if you “hate” math, you are probably using it successfully in everyday situations.

Consider giving your student an opportunity to interview people about how they use math in everyday life. This could have quite an effect on the people being interviewed when they realize that they use mathematics successfully on a daily basis.

If students are to become the thinkers of tomorrow, they must discover that mathematics is alive and related to every aspect of their lives. When you help students discover this fact, you have set in motion a powerful motivating force. You can help keep this force alive by looking for and talking about mathematics in things you do or see with your student. You don’t have to get technical; just get the child interested and raise some questions. Start with things that you know the student likes, such as a specific sport or piece of music.

Mathematics is much more than something children do because “It’s good for them.” It is an important tool that can help make their dreams come true.



# Glossary

The following words are defined in a mathematical context as used within this program. If introduced to the student, these words are spoken only, so it is not necessary to review the list with the child. Students at this level are not required to read, spell, or write these words, with the exception of the number words from zero to ten. You may find these definitions useful when explaining words to the student.

**about:** very close to; approximately

**above:** over or higher than

**accordingly:** as someone has said or written

**across:** from one side of to the other; over

**actual:** real; existing

**act out:** the process of doing

**add:** find the sum of two or more numbers

**addend:** any number that is added to obtain a sum, for example

$$\begin{array}{r} 2+3 \\ \hline \text{addends} \end{array} = \begin{array}{r} 5 \\ \hline \text{sum} \end{array}$$

**addition:** the adding of two or more numbers

**advertisement:** a public notice that tells about a product, event, or service

**after:** following in place or order; behind

**afternoon:** the part of the day between noon and evening

**alike:** in the same way; similarly

**all:** the whole of; every one

**amount:** the sum of two or more numbers or quantities

**another:** one more; an additional or a different one; some other

**answer:** the solution to a problem

**appropriate:** suitable; proper; correct

**approximate:** nearly the same as; close to

**around:** in a circle or path that surrounds

**arrow:** a straight, slender shape that has a sharp point on one end 

**attribute:** a characteristic of an object when sorting

For example, objects can be sorted according to such attributes as size, colour, shape, thickness, and number of sides.

**autumn:** the season of the year between summer and winter

**avenue:** a wide road in a town or city

**backward:** in the reverse direction; opposite to forward

**balance:** the condition in which opposite sides or parts are the same in some way, such as weight, amount, or force

**balance scale:** a device that measures mass with two pans at the ends of a pivoting rod



**banker:** person or company that keeps a bank

**base:** the part that something stands on; the lowest part

**base line:** a common line from which to measure

**before:** in front of; ahead of

**below:** in a lower place than; beneath

**beneath:** lower than; below; under

**beside:** at the side of; next to

**between:** in the middle; if something is between two other things, they are on either side of it.

For example, the number eight is between the numbers seven and nine.

**big:** great in size or amount; large

**boil:** heat a liquid so that bubbles form and steam is given off

**border:** a strip along the edge of something

**bottom:** the lowest part

**broken line:** a line that is in pieces

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**calculate:** find out by using addition or subtraction

**calculation:** the act of calculating

**calculator:** a machine that does mathematical problems

**calendar:** a chart showing the days, weeks, and months of the year

**Canadian:** a person who was born in or is a citizen of Canada

**capacity:** the amount of something that can be held in a space

**cardinal:** a number that tells how many

**cent:** a coin of Canada and other countries

One hundred cents is equal to one dollar.

**centre:** the middle point, part, or place of something

**change:** the money given back when the amount paid is more than the amount owed; to make or become different

**chart:** a sheet that shows information in the form of a list, diagram, table, or picture

**check:** a test to find out if something is correct or as it should be

**check mark:** a mark to show that something is correct ✓

**circle:** a curved line whose ends meet to form a ring



**circular:** having or making the shape of a circle

**clear:** remove to leave a space open

**close:** nearly even; almost equal

**coin:** a disk of metal used as money

A coin is stamped with official government markings to show how much it is worth.

**cold:** having a low temperature; not warm

**collection:** a gathering together

**column:** a narrow, vertical section of a page, reading from top to bottom

**combination:** something joined together into a group

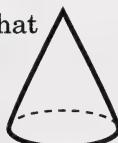
**combine:** join together; unite; mix

**compare:** study to find out how persons or things are alike or different

**comparison:** finding the likenesses and differences between persons or things

**concrete graph:** a graph using real objects

**cone:** a solid or hollow object that has a flat, round base with straight sides that come together at a point



**congruent:** exactly equal in shape and size

**connect:** fasten or join together

**connection:** something that fastens or joins things together; relationship; association

**cool:** somewhat cold

**corner:** the place or point where two lines or surfaces come together

**cost:** an amount of money paid or charged for something; price

**count:** find out how many of something there are; add up

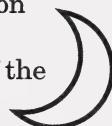
**countdown:** count backward

**counting:** finding out how many; naming numbers in order

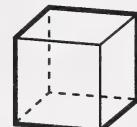
**country:** an area of land that has boundaries and a government shared by all the people

**cover:** put something over or on

**crescent:** the curved shape of the crescent moon



**cube:** a solid or hollow figure with six equal, square sides



**cubit:** an ancient measure of length, equal to about 50 centimetres

**curve:** a line that bends in one direction

**cylinder:** a solid or hollow object shaped like a drum or soup can



**data:** gathered information, such as a set of numbers or facts

**data management:** the organizing of data

**date:** the time when something happens

**day:** the period of light between the rising and setting of the sun; the 24 hours of one day and night

**decrease:** make or become less

**design:** a drawing or outline made to serve as a guide or pattern

**diamond:** a two-dimensional figure with four equal sides, shaped like a square standing on one corner



**different:** not the same

**difference:** the state or quality of being unlike; the number that is left after subtracting one number from another number

**digit:** one of the numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9

**dime:** a coin in Canada and the United States that is worth ten cents

**display:** show or exhibit

**distance:** the amount of space between two things or points

**dot:** a small round mark; small spot or speck

**down:** in a lower place or position

**downward:** from a higher to a lower place

**dozen:** a group of 12

**duration:** the length of time during which something continues

**each:** every individual person or thing in a group

**edge:** a line or place where something ends

**eight:** one more than seven

**eighth:** next after the seventh

**eighty:** eight times ten

**empty:** having nothing in it

**end point:** the last part of something

**enough:** as much or as many as needed

**equal:** the same in value and amount

**equals sign:** a sign that shows that two amounts are the same in value  $=$

**equivalent:** equal in number or value

For example, a quarter is equivalent to five nickels.

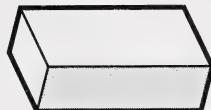
**estimate:** an opinion of the value, quality, quantity, size, or cost of something; decide roughly how much a number is

**evening:** the late afternoon and early nighttime

**event:** anything that happens, especially anything that is important

**extend:** make or be longer

**face:** one of the flat sides of a solid shape



**facts:** what is true, or what really happened

**fair:** not in favour of any one more than another

**fall:** autumn

**false:** untrue; not true or correct

**far:** more distant; farther away

**farther:** a comparative of far

**fathom:** a measure of length equal to 1.83 metres, used mainly in measuring the depth of water

**feature:** a part or quality of something

**fewer:** a smaller number of persons or things; not as many

See the note with the word *less*.

**fifth:** next after the fourth

**fifty:** five times ten

**figure:** a symbol that stands for a number; a form or an outline; to find out by using numbers

**figure out:** learn, understand, or solve

**first:** before all others

**five:** one more than four

**flap:** something attached at only one edge so that its other edge can move freely

**flat:** smooth and even; level

**flip side:** the other side of something that is turned over

**float:** a given amount of money to make change

**fold:** bend or double over on itself

**follow:** go or come after

**forecast:** tell what will or might happen; predict

**form:** the outline of something; shape

**forty:** four times ten

**forward:** ahead; onward; toward the front

**four:** one more than three

**fourth:** next after the third

**freeze:** harden because of the cold

**Friday:** the sixth day of the week

**front:** the part that faces forward or comes first

**frost:** tiny ice crystals that form when water vapour from the air is frozen on a surface

**funnel:** an open utensil with a wide cone at one end and a thin tube at the other, used for pouring liquids or small solids such as sand into containers with small openings



**geometric shapes:** shapes that are two-dimensional so they have length and width but not height or thickness

**geometric solids:** shapes that are three-dimensional, so they have length, width, and height

**geometry:** the part of mathematics that deals with lines, angles, shapes, and solids

**greater:** larger in size, number, or amount

**group:** a number of persons or things together

**half:** one of two equal parts of something

**head:** the side of a coin that shows a picture of a person's head

**heavy:** having great weight; having more than the usual weight

**height:** the distance from bottom to top

**hexagon:** a shape or figure with six sides



**high:** tall; at a great distance from the ground

**holds:** contains

**horizontal:** flat and straight across

**hot:** having a high temperature

**how:** in what way; by what means

**hundred:** ten times ten

**identical:** the very same

**identify:** find out or tell exactly who a person is or what a thing is

**increase:** make or become larger in number or size

**ingredient:** any one of the parts that go into a mixture

**inside:** the inner side or part

**inventory:** a complete list of items that someone owns

**invitation:** a written or spoken request to do something

**irregular:** not following a pattern

**item:** a single thing in a group or list

**join:** come together, or come together with

**kilogram:** a unit of mass in the metric system

**kinesthetic:** having to do with sensations from the muscles and joints

**large:** big in size or amount

**least:** smallest; littlest

**left:** on the west side of your body when you face north

**left over:** remaining

**length:** the longer measurement of any shape or line

**less:** smaller; not as much

In this course, the terms *fewer* and *less* are used to mean the same thing when they apply to number relationships—not as many.

**light:** having little weight; not heavy

**like:** almost the same as; similar to

**line:** a long, thin mark or stroke \_\_\_\_\_

**long:** having or lasting for a certain length; measuring a lot or more than usual from end to end

**loonie:** a Canadian coin worth one dollar or 100 pennies

**low:** not high or tall

**manipulatives:** practical, hands-on materials

**many:** a large number of people or things

**maple leaf:** leaf with deep notches and five points; a Canadian symbol

**mass:** a body of water with no particular shape; the quantity of matter that a body contains

**match:** equal to or like something else

**maze:** a confusing series of paths or passageways through which people may have a hard time finding their way

**measure:** find the size, weight, or amount of something

**member:** a person, animal, or thing that belongs to a group

**middle:** halfway between two things

**mint:** make coins for a country

**minus:** decreased by; less

**minus sign:** a sign that looks like a dash and means that the number following it is to be subtracted

**mirror:** a smooth, polished surface that shows the image of a person or thing in front of it by reflecting light

**model:** a person or thing that is a good example of something and is copied

**Monday:** the second day of the week

**money:** the coins and paper currency of a country used to buy goods and pay people for services

**more:** greater in number or amount

**morning:** the early part of the day, ending at noon

**mosaic:** a picture or design made by fitting together bits of coloured stone, glass, tile, or other material and cementing them in place

**most:** greatest in number, amount, or degree

**much:** great in quantity or amount

**multiple:** a number that is the product of multiplying one number by another

**narrow:** not wide or broad

**navigator:** a person who is in charge of determining the course or direction of something

**near:** not far or distant

**next:** following immediately after

**nickel:** a coin in Canada and the United States that is worth five cents

**night:** the period of dark between the setting and rising of the sun

**nine:** one more than eight

**ninth:** next after the eighth

**ninety:** nine times ten

**nominal:** numbers used to name or identify objects, for example, a street number or postal code

**none:** not any

**non-proportional models:** items that do not show any size relationship

For example, ten pennies are physically bigger than a dime but are equal in value to a dime.

**noon:** 12 o'clock in the daytime; the middle of the day

**number:** the written word or symbol form of number

For example, 20 is a number.

**number line:** a line on which points are marked with numbers

A number line shows the correct order of numbers and tells how big one number is compared to another number.

**number name:** a name by which a given number can be known

**number sentence:** a statement about numbers, for example,  $1 + 5 = 6$

**number story:** a story about a number sentence

**object:** anything that can be seen or touched

**one:** a single person, thing, or unit

**one-to-one correspondence:** matching one number to one object

**operation:** the act or way of working or directing

**operation sign:** addition or subtraction sign

**opposite:** on the other side of, or across from; turned or moving the other way

**order:** the way in which things are arranged; the position in a series

**ordinal number:** a number that shows position in a series

*First, second, and third* are ordinal numbers.

**other:** a different or additional person or thing

**outside:** the outer side, surface, or part

**oval:** shaped like an egg 

**pace:** length of a step in walking

**pair:** a set of two things meant to be used together

**palm:** the inside surface of the hand between the wrist and the fingers

**past:** gone by; ended; over

**path:** a trail or way for walking

**pattern:** the way in which lines, shapes, colours, sounds, or actions are arranged or repeated in the same order

**penny:** a coin worth one cent in Canada and the United States

**picture graph:** a graph that uses picture symbols to represent quantities

**place value:** the position of a digit that represents its value as a number

For example, the 3 in 34 means *30* or *three tens* and has a different meaning from the 3 in 43, which means *three ones*.

**plus:** with the addition of

**plus sign:** a sign showing that something is to be added +

**point:** a dot or mark; a fine, sharp end

**poll:** a collection of votes or opinions

**position:** the place where a person or thing is

**predict:** tell beforehand

**prediction:** the act of predicting something; something that is predicted

**present:** going on at this time; being or happening now

**price:** the amount of money for which something is sold or offered for sale

**principle:** a basic truth, law, or belief

**probability:** the likelihood or chance of an event happening

**problem:** a question; something to be worked out

**problem solving:** the process of thinking about a problem and then deciding on a solution

**properties:** characteristics of something

**proportion:** the relation of one thing to another with regard to size, number, or amount

**proportional models:** items that show relation in physical size

For example, ten items are exactly ten times the size of one item.

**purchase:** get something by paying money; buy

**quantity:** a number or amount

**quarter:** a coin in Canada and the United States that is worth 25 cents

**queen:** a woman who rules a kingdom

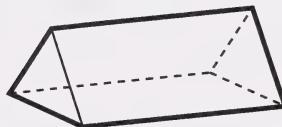
**question mark:** a mark put after a question in writing



**rectangle:** a shape that has four straight sides, opposite sides equal in length, and four square corners



**rectangular prism:** a solid geometric shape that has three sides shaped like rectangles that are equal in area and two ends shaped like triangles



**reference:** a person or thing referred to; a source of information

**reflect:** think seriously or carefully

**reflection:** an image given back by a reflecting surface such as a mirror

**regular:** happening again and again at the same time

**related:** connected; belonging to the same family

**relationship:** the condition of being related; connection

**remain:** be left in a place; stay

**repeat:** say, do, or make again

**reversal:** change to the opposite

**reverse:** something directly opposite of something else

**riddle:** a question or problem that is hard to figure out or understand

**right:** on or toward the east side of your body when you face north

**road:** a way of going or moving toward something

**roll:** move by turning over and over

**rote:** a set way of doing things

**round:** shaped like a ball or globe; having a curved outline or surface

**route:** a road or other course used for travelling

**row:** a series of people or things arranged in a horizontal line

**ruler:** a strip of wood, plastic, or metal marked off in measuring units

**sale:** an exchange of goods or property for money

**same:** like another in every way

**Saturday:** the seventh day of the week

**scene:** the place where something happens; a part of an act in a play

**schedule:** a list of times, event, or things to do

**season:** one of the four parts of the year; spring, summer, autumn (fall), and winter

**second:** next after the first

**section:** a part taken from a whole; portion

**separate:** keep apart; divide

**sequence:** the coming of one thing after another

**set:** a group of numbers, shapes, or objects with a particular attribute in common

**seven:** one more than six

**seventh:** next after the sixth

**seventy:** seven times ten

**shadow:** a dark area or figure made when rays of light are blocked by a person or thing

**shape:** form or figure

**short:** not long or tall

**side:** at or near one edge of a thing

**similar:** having many but not all qualities the same; alike

**similarity:** the quality or condition of being similar; likeness

**simultaneously:** doing, existing, or happening at the same time

**single:** only one

**six:** one more than five

**sixth:** next after the fifth

**sixty:** six times ten

**size:** the amount of space something takes up; the length, width, and height of something

**skinny:** very thin

**slide:** move or cause to move smoothly, easily, or quietly

**small:** not large; little

**solid:** term used to describe three-dimensional shapes that have length, width, and thickness

**solve:** find the answer to

**sort:** group according to a chosen attribute

For example, objects can be classified according to size, colour, shape, thickness, and number of sides.

**sorting rule:** the way things are sorted into sets

**space:** a distance or area between things

**span:** the full reach or length of anything

**sphere:** a round body like a ball



**square:** a rectangle that has four equal sides



**stack:** a number of things piled up, one on top of the other

**start:** begin to act, move, or happen

**statistics:** numbers, facts, and other data collected about a particular subject

**storyboard:** a scene on a piece of cardboard that is used for the background of a story

**straight:** without a bend or curve; direct

**straight line:** a line that has no curves or bends

**strategy:** a plan for achieving a goal

**street:** a public way in a town or city, often with sidewalks and buildings on both sides

**stride:** a long step

**strip:** a long, narrow piece of something

**subset:** a set whose members are all members of another set

**subtract:** take away from

**subtraction:** taking away one number from another number to find the difference

**sum:** the number that results from adding two or more numbers together

**Sunday:** the first day of the week

**superimposing:** placing on top of something else

**surface:** the outside of a thing; the outer look or appearance

**survey:** look at or study in detail

**symbol:** something that represents something else

**symmetry:** a balanced group of parts on either side of a line or around a centre

**tail:** the side of a coin that does not show a person's head

**tall:** higher than average; not short or low

**tally:** an account or a record

**temperature:** the degree of heat or cold

**ten:** one more than nine

**tenth:** next after the ninth

**test:** any method of finding out the nature or quality of something

**third:** next after the second

**thirty:** three times ten

**three:** one more than two

**Thursday:** the fifth day of the week

**time:** the period during which all events, conditions, and actions happen or continue; an exact point in time

**today:** this present day or time

**tomorrow:** the day after today

**top:** the highest or upper part of something

**total:** all there is; making up the whole

**tracking:** the process of moving your hand or finger smoothly along below words as you read them

**trade:** the giving of one thing in return for something else

**trapezoid:** a flat figure with four sides; only two of the sides are parallel



**triangle:** a shape with three straight sides



**true:** not false, wrong, or made up

**Tuesday:** the third day of the week

**twenty:** two times ten

**twin:** identical or very much alike

**two:** one more than one

**type:** a group of things that are alike or have the same qualities

**underneath:** in a place or position lower than; under; beneath

**uniform:** always the same; not changing

**unit of measurement:** a fixed quantity or amount that is used as a standard of measurement

**unusual:** not usual, common, or ordinary

**up:** from a lower to a higher place or position

**upper:** higher in position

**value:** the worth, usefulness, or importance of something

**variety:** a number of different things

**verify:** prove the truth of

**vertical:** straight up and down

**volume:** the amount of space occupied

**warm:** somewhat hot; not cold

**way:** a course of action for doing or getting something

**weave:** make something by passing strands or lengths of material over and under one another

**Wednesday:** the fourth day of the week

**week:** a period of seven days

**weight:** the amount of heaviness of a person or thing

**what:** which one or ones; a word used to ask questions about persons or things

**who:** a word used to ask questions about a person or persons

**whole:** having all its parts; entire; complete

**wide:** having a certain distance from side to side

**width:** the distance from one side of something to the other

**worth:** having the same value as

**year:** a period of time made up of the 12 months from January 1 to December 31

**yesterday:** the day before today

**zero:** nothing; not any; none at all; the number zero, which means no quantity or amount at all

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EyeWire, Inc.

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# **APPENDIX**

## **to the**

# **Home Instructor's Manual**

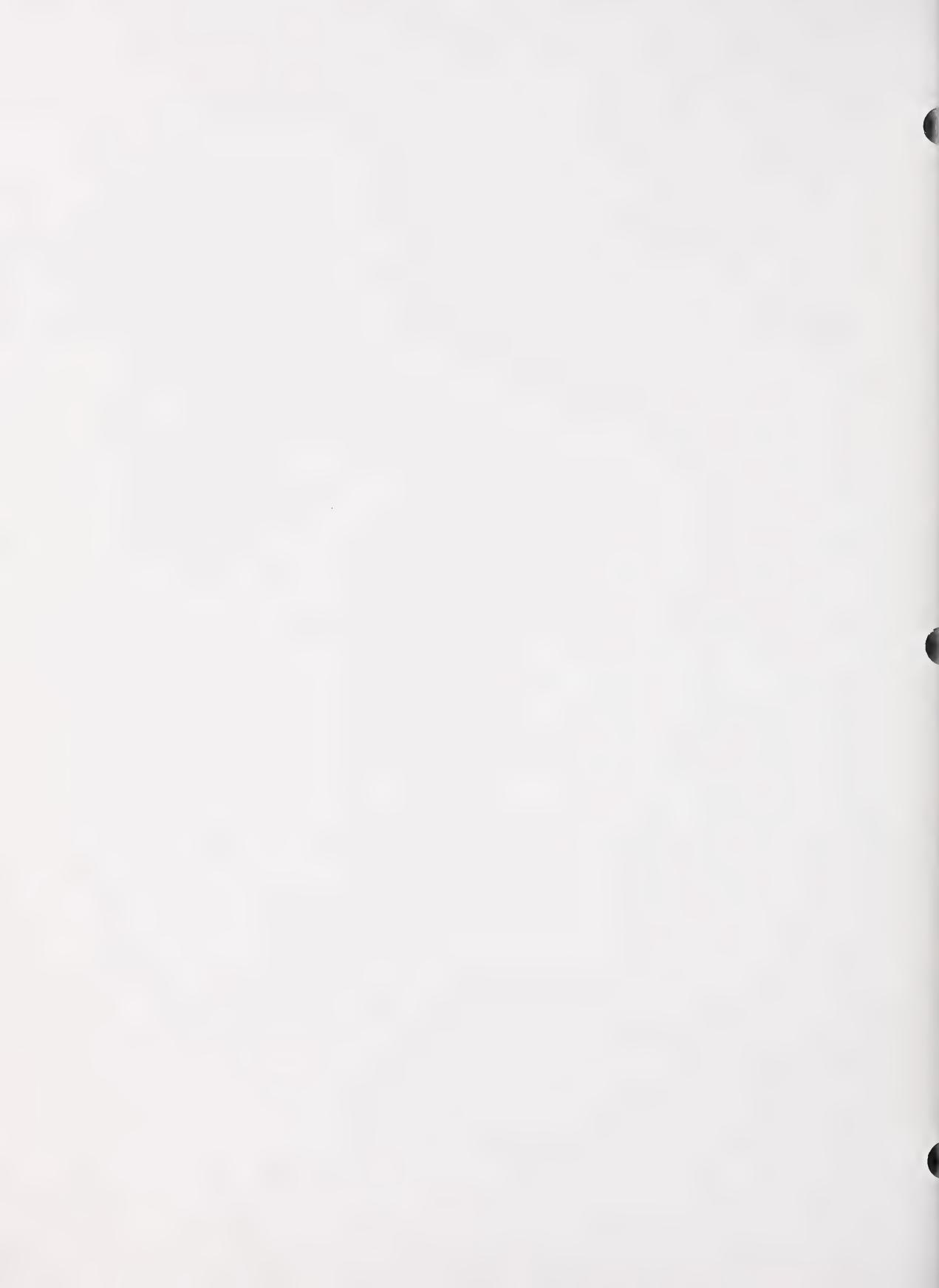


# Printing Chart

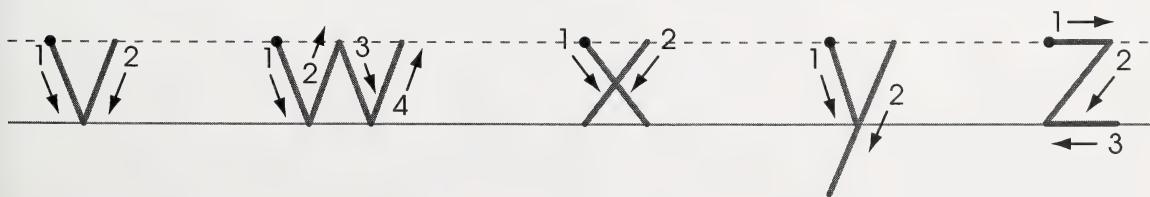
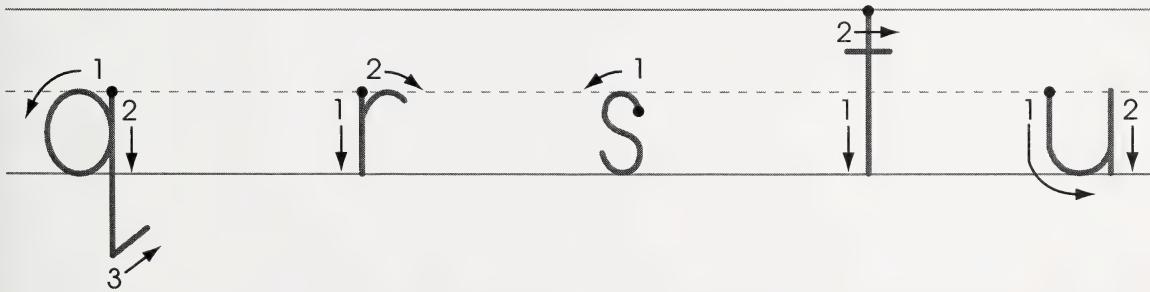
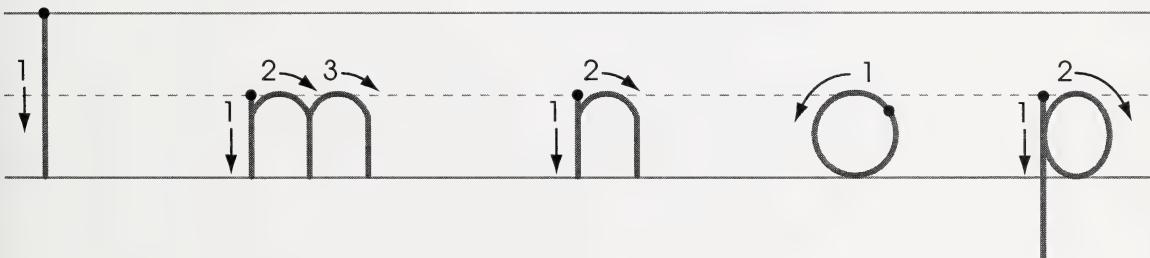
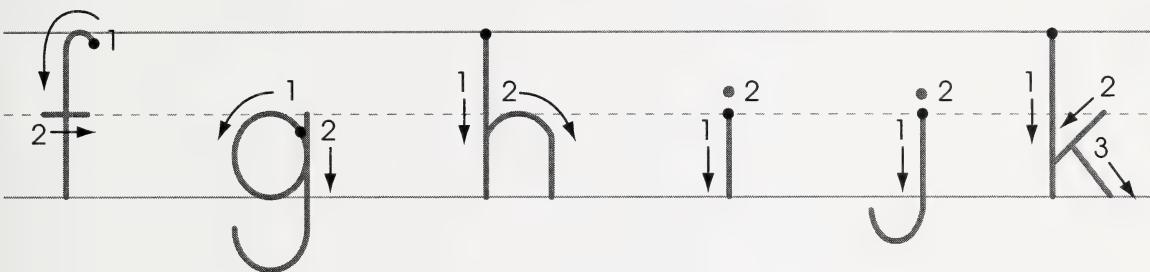
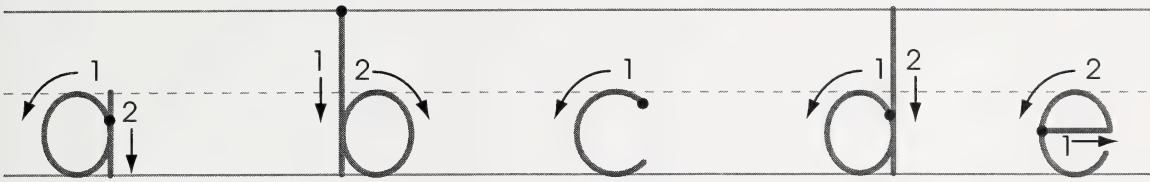
Note the correct order and direction of strokes.

## Capital Letters



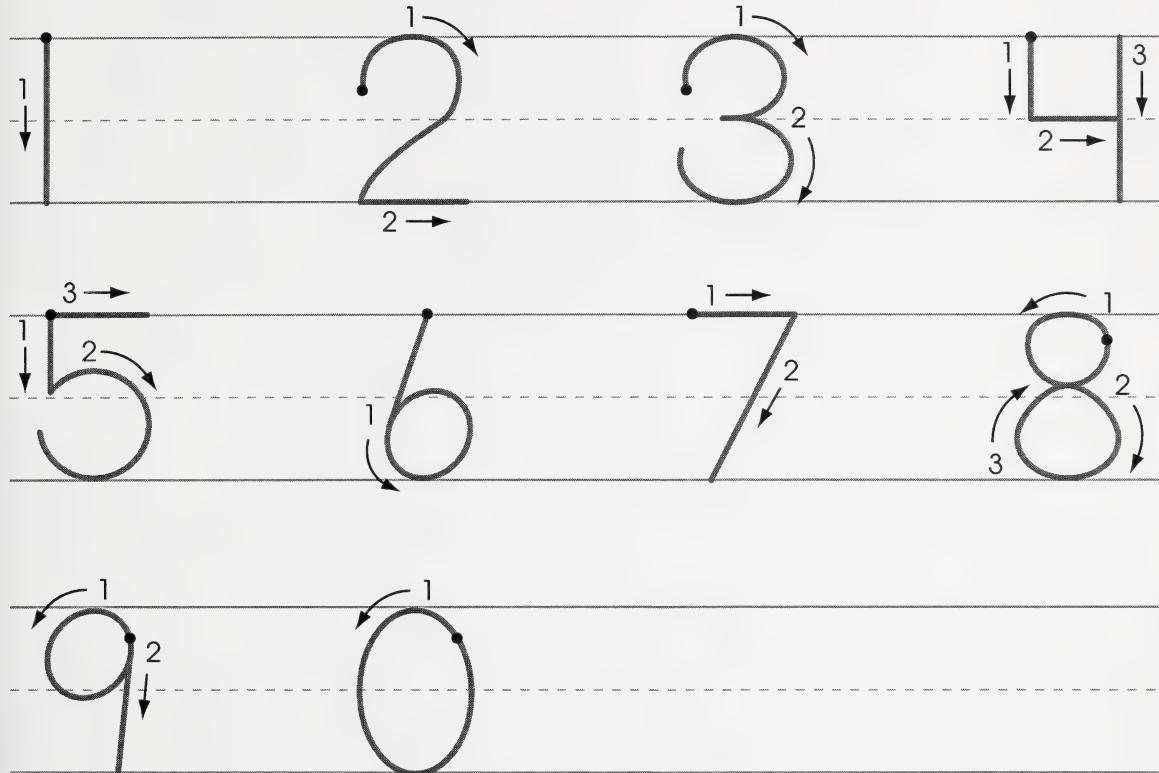


## Lower-case Letters

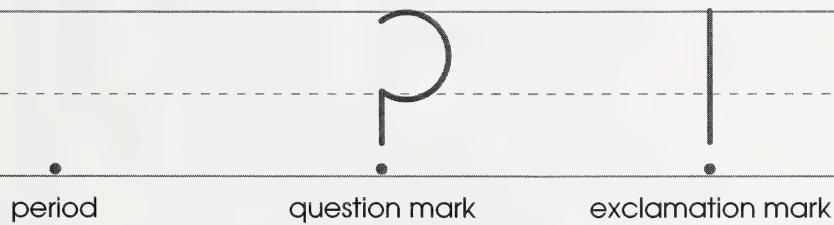


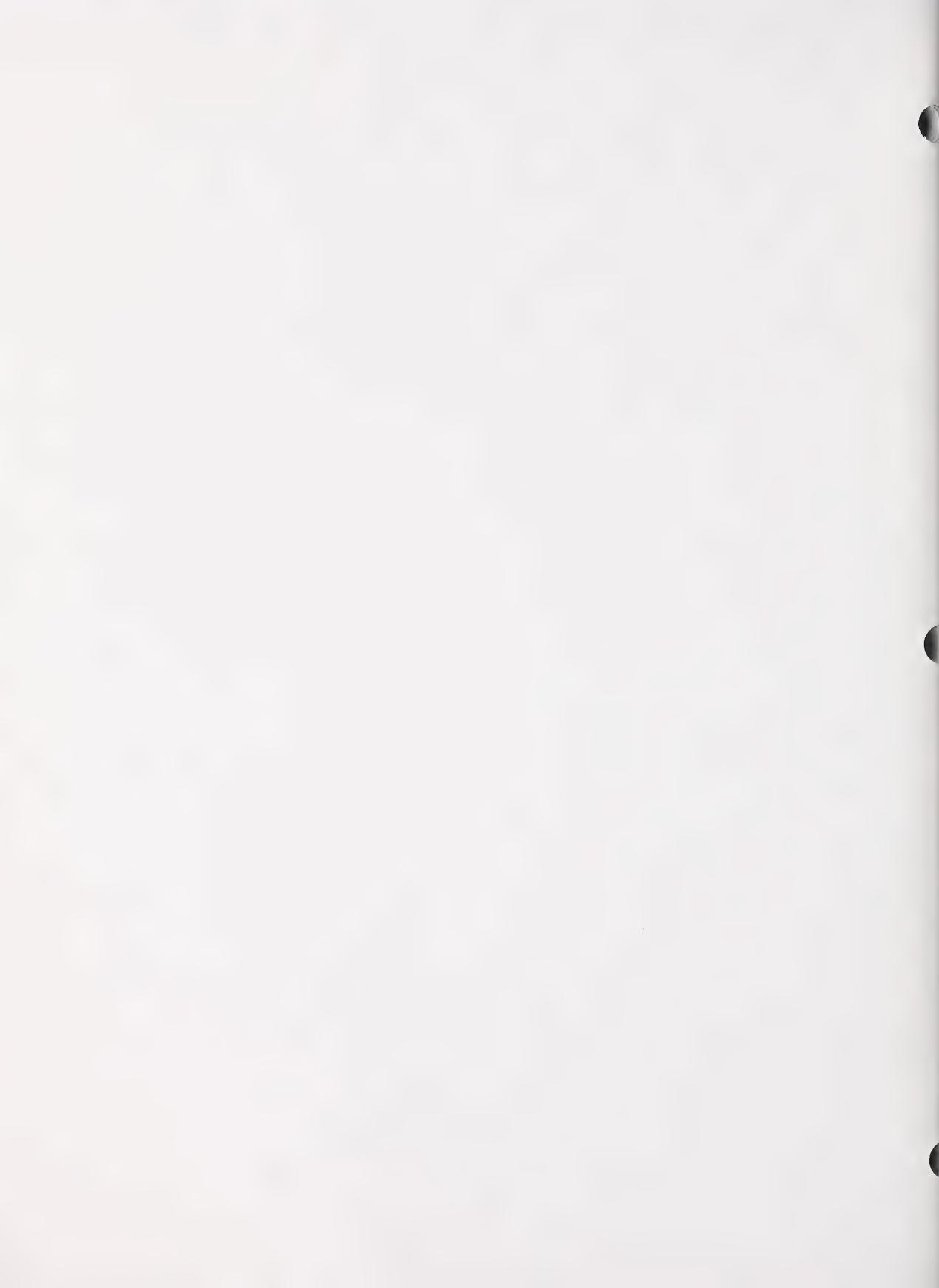


## Numerals

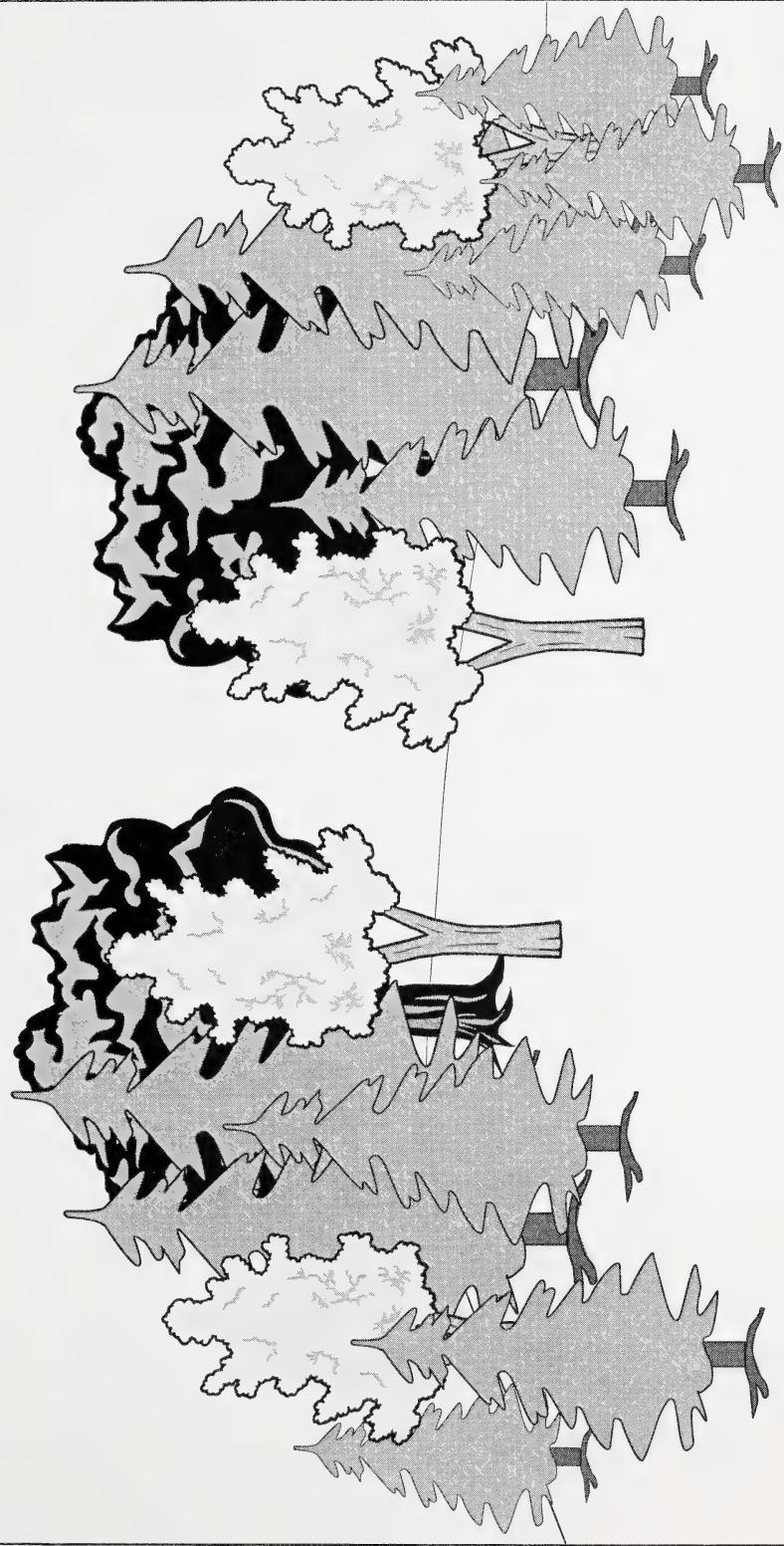


## Punctuation Marks





Storyboard





## Homemade Modelling Dough

250 mL	white flour	1 cup
125 mL	salt	$\frac{1}{2}$ cup
10 mL	cream of tartar	2 tsp.
250 mL	water	1 cup
30 mL	cooking oil	2 tbsp.
5 mL	food colouring	1 tsp.

Combine dry ingredients in a large saucepan.

Gradually stir in liquid ingredients.

Cook over medium heat, stirring constantly with a wooden spoon until a large ball forms.

Remove from heat, cool slightly, and knead until smooth.

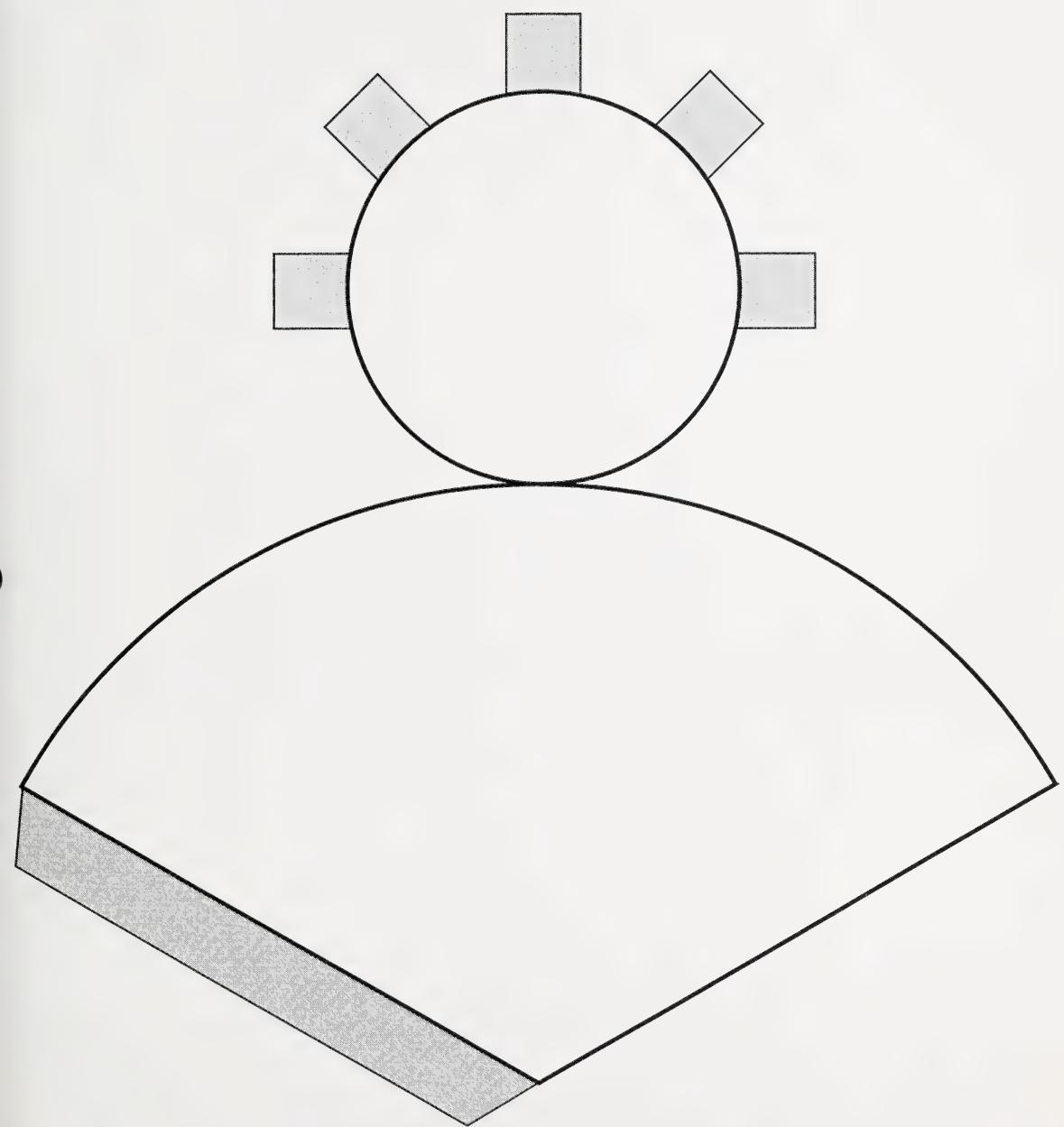
**Caution:** Allow the dough to cool enough to handle safely before kneading or allowing the student to work with it.

Store the dough in an airtight container.



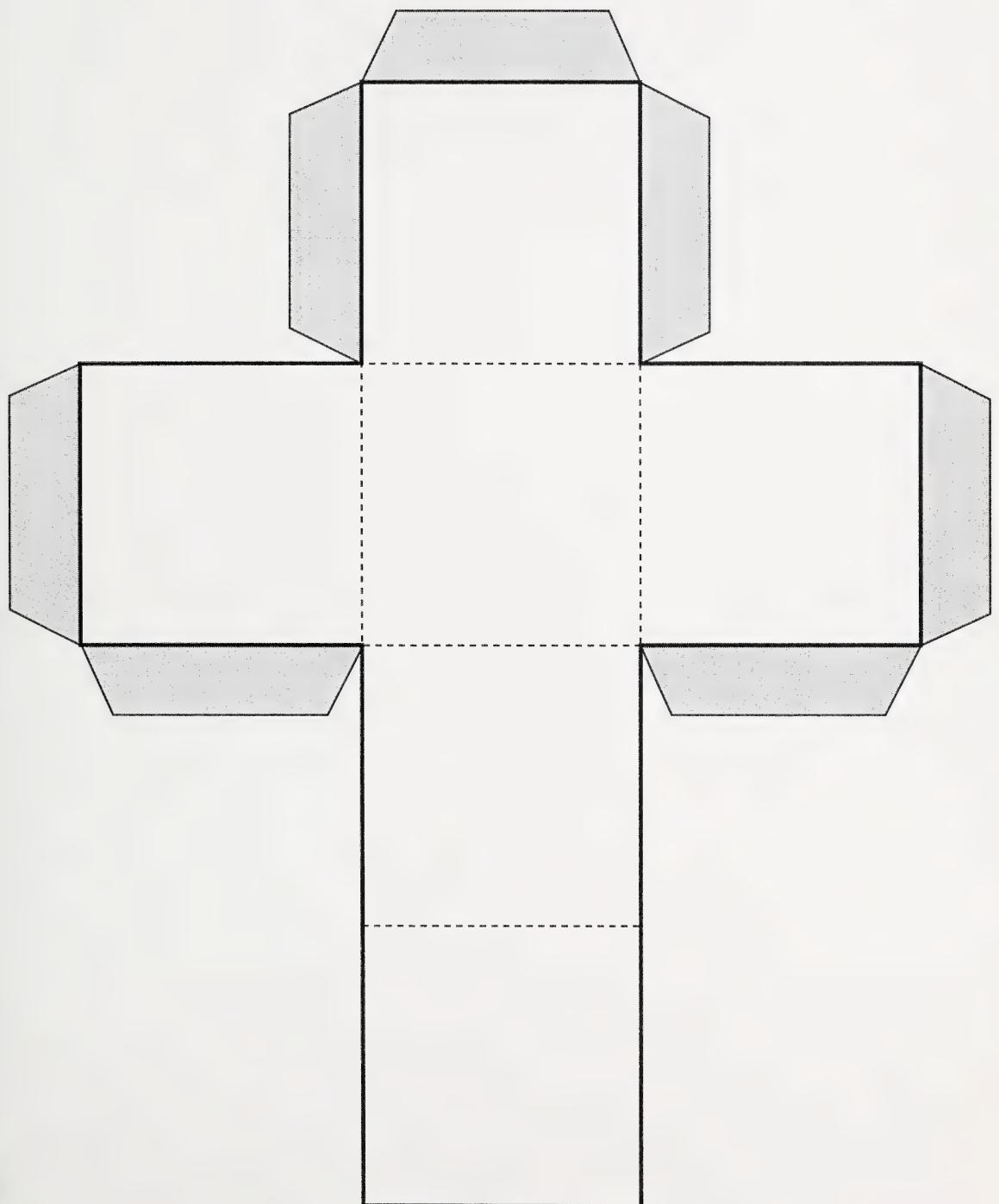


**Cone**



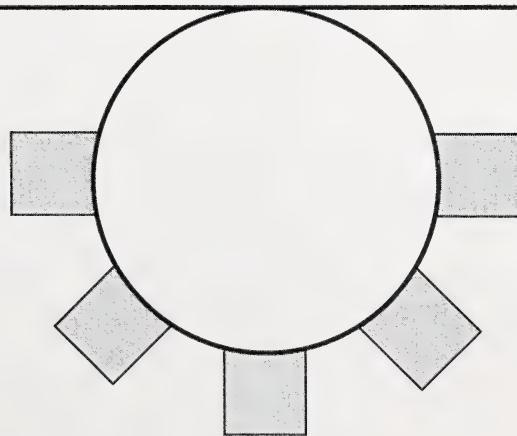
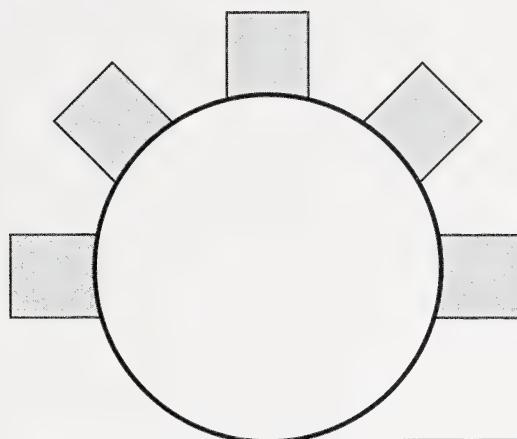


**Cube (Box)**



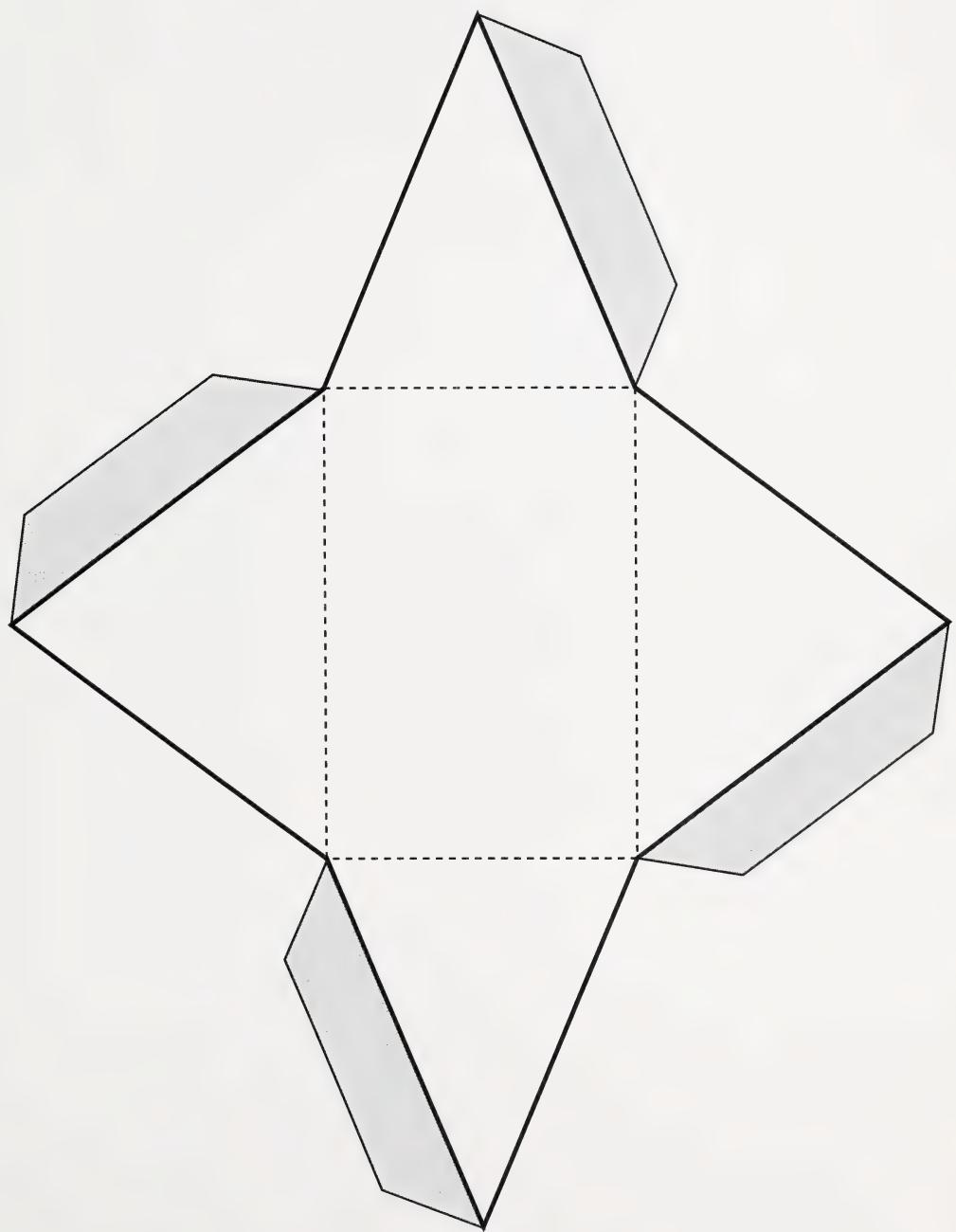


**Cylinder**



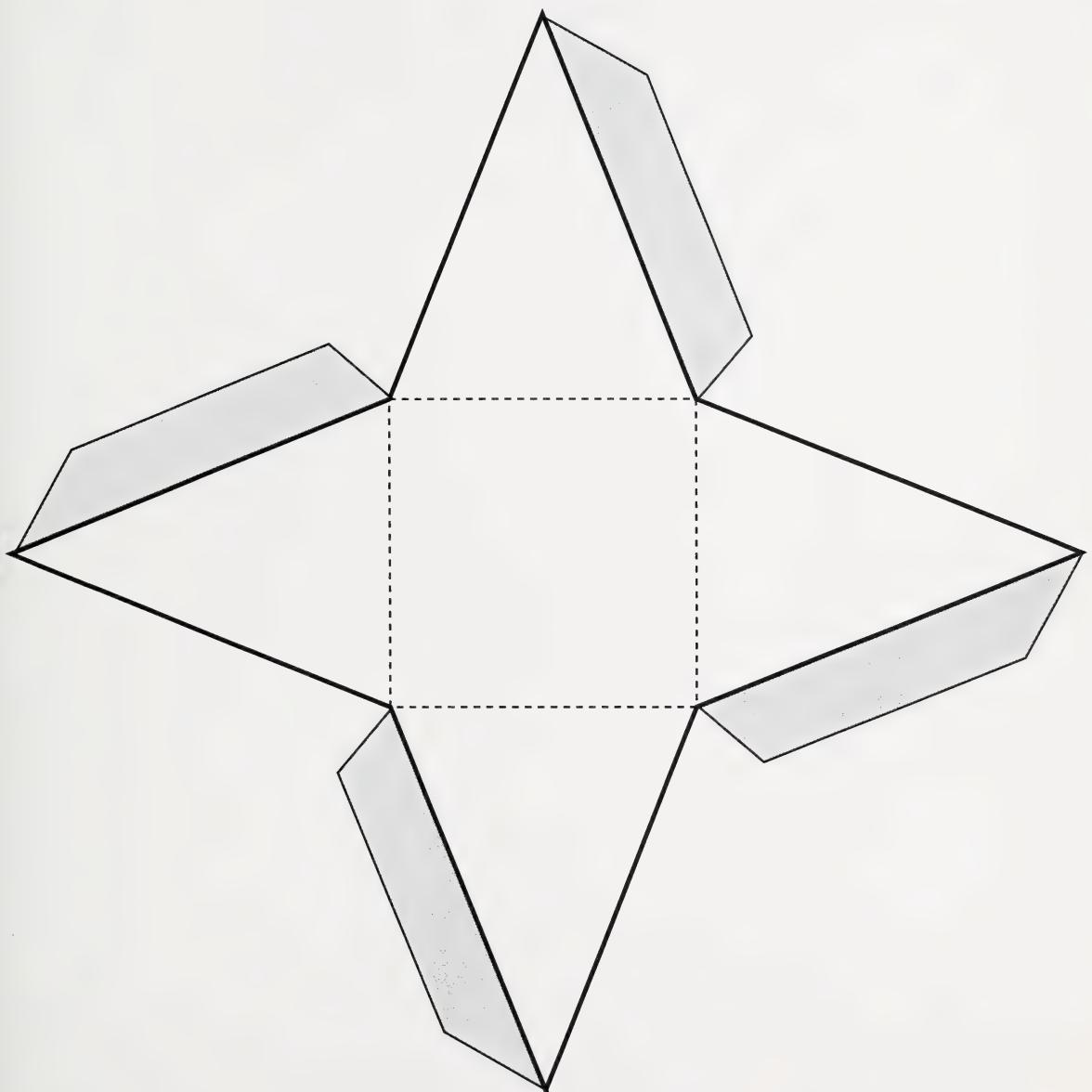


## Rectangular Pyramid



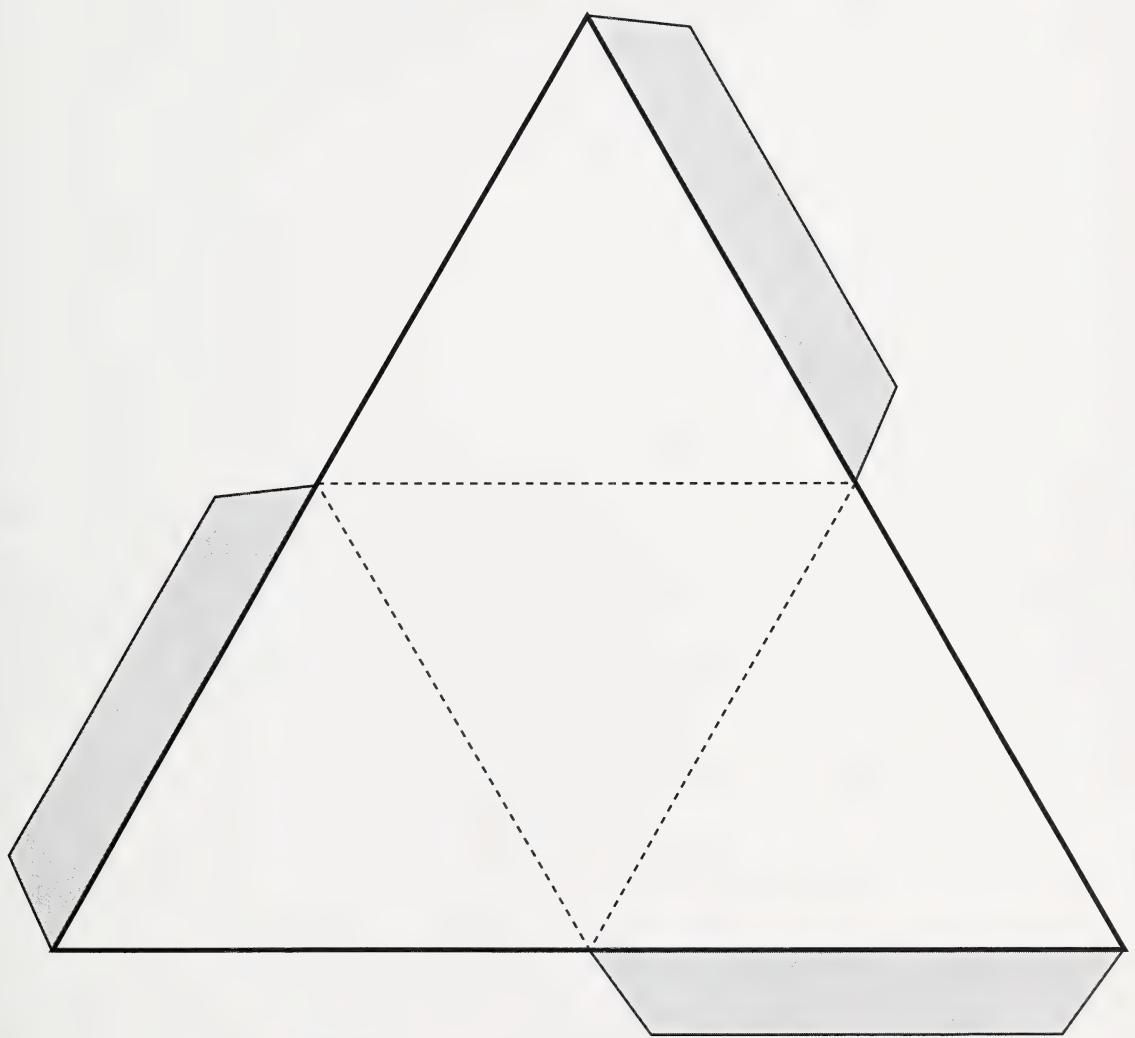


## Square Pyramid



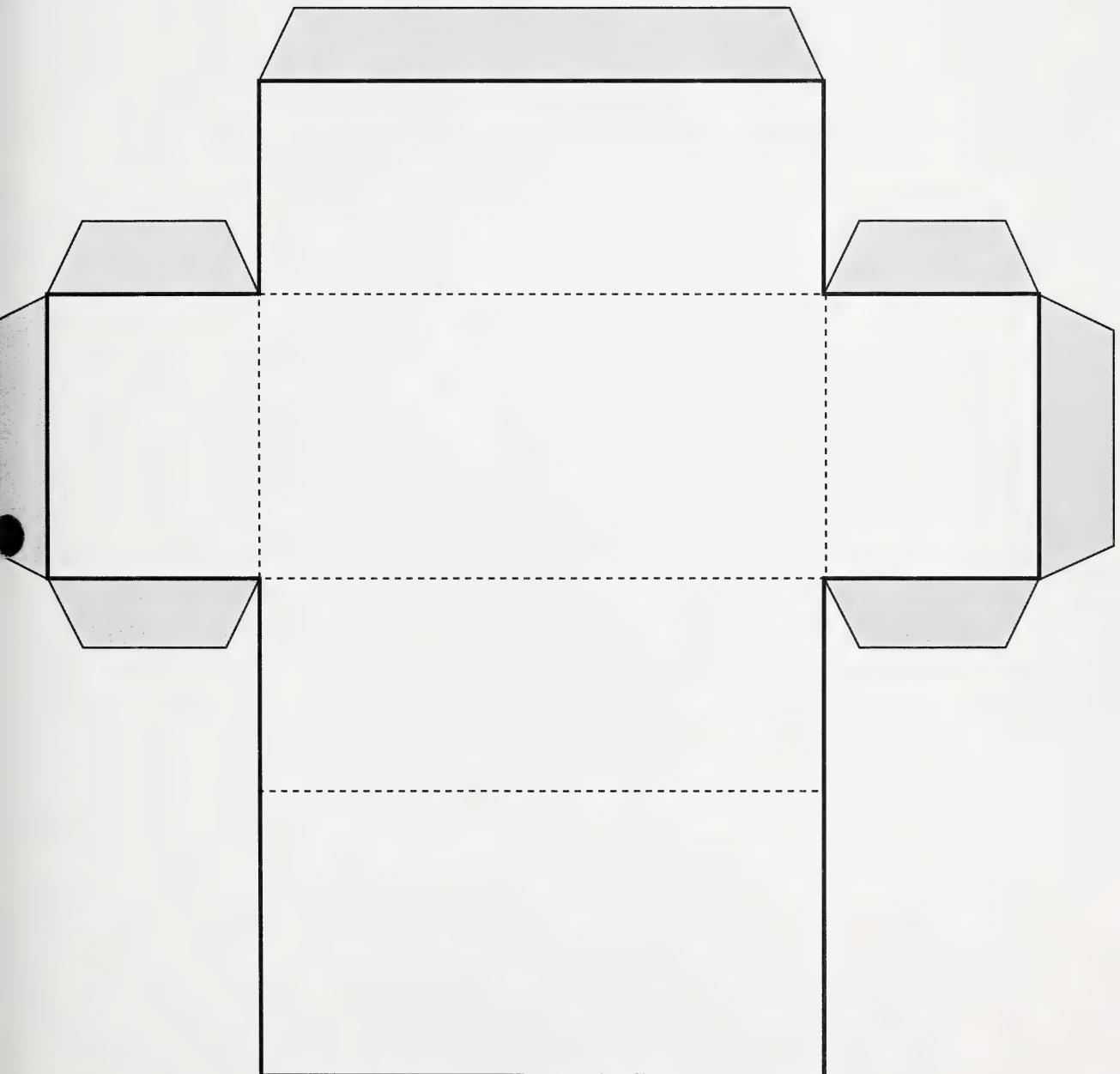


## Triangular Pyramid



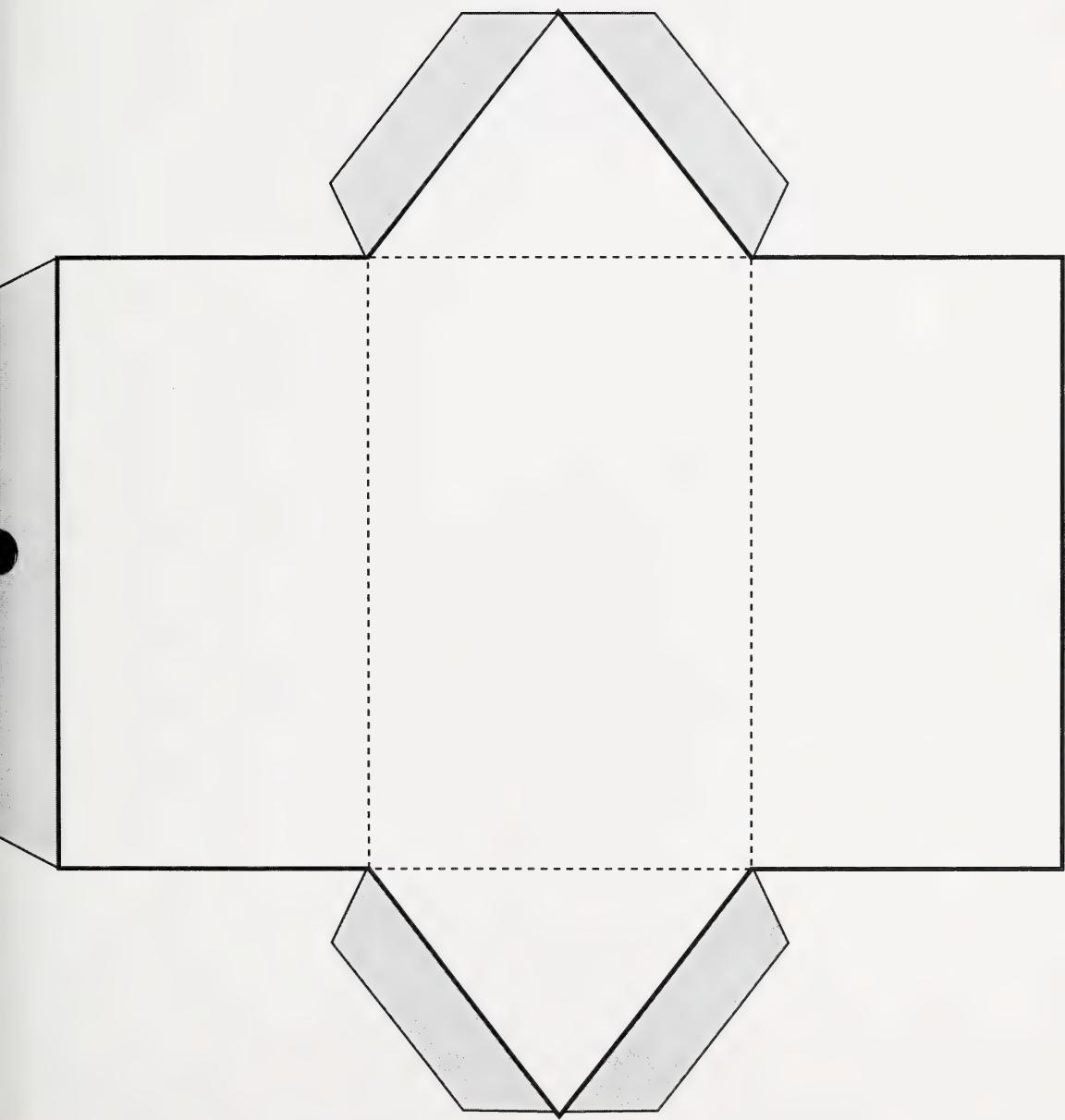


## Rectangular Prism





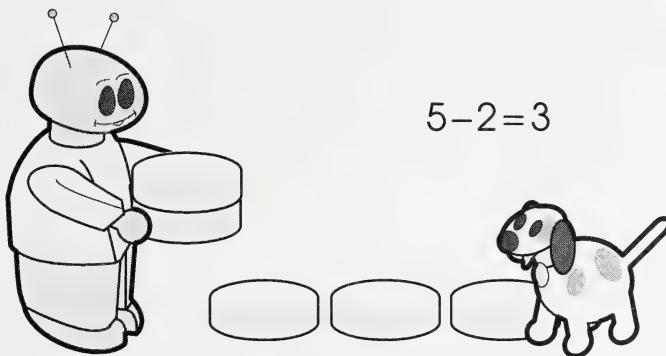
## Triangular Prism



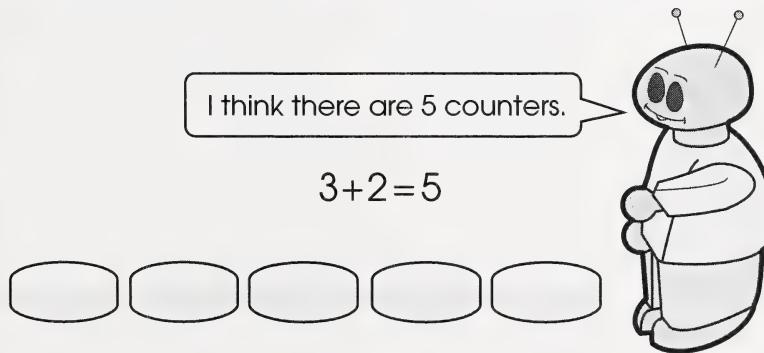


# Problem-Solving Strategies

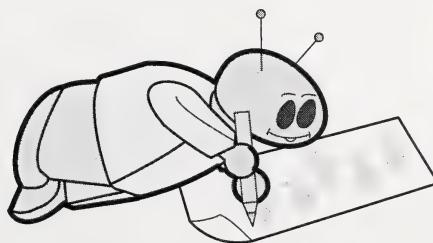
1. **Act Out the Problem:** In this strategy, the student goes through the actions of the problem, either with others or by manipulating objects.



2. **Predict and Check:** The student makes an educated guess based on previous related knowledge and important information given in the problem.



3. **Make a Model or Draw a Picture:** For this strategy, the student constructs only what is essential to show the problem.

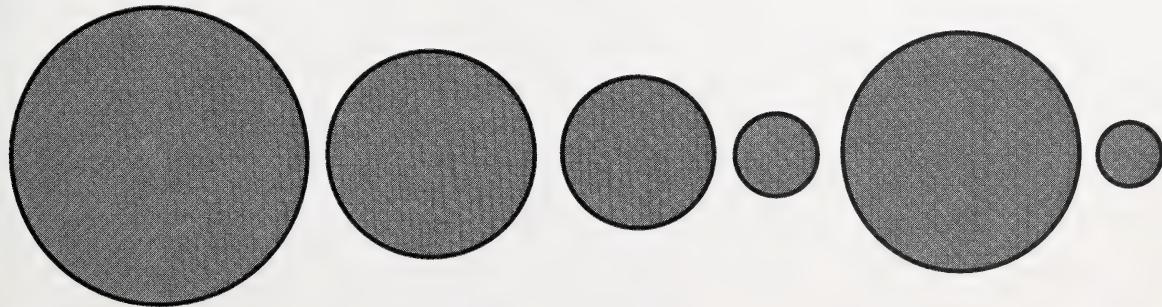
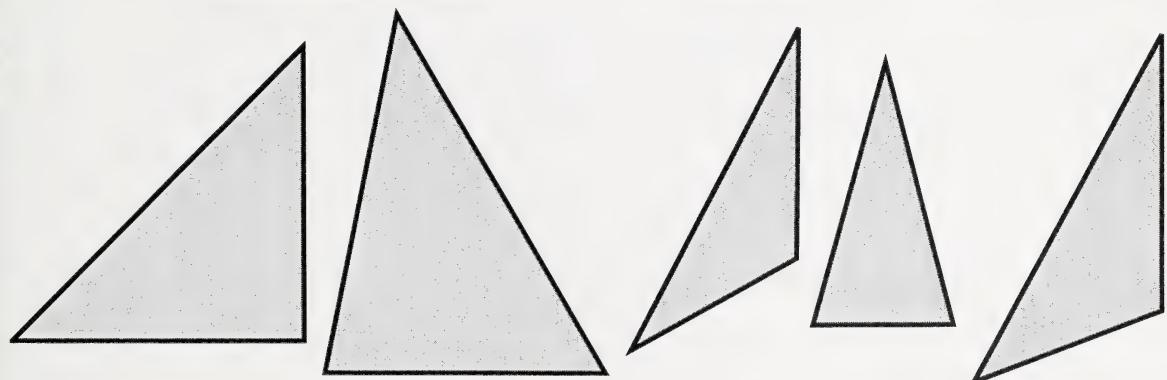
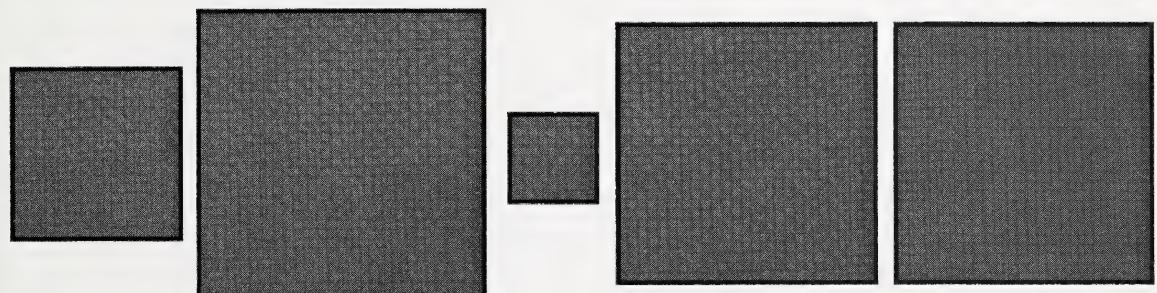
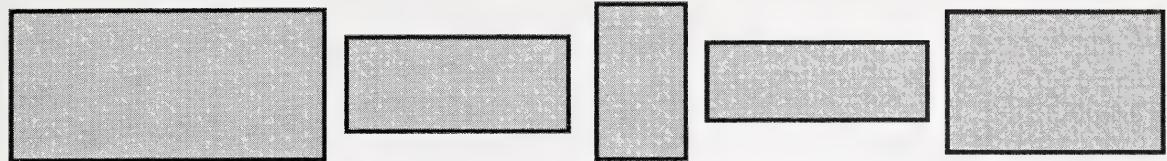


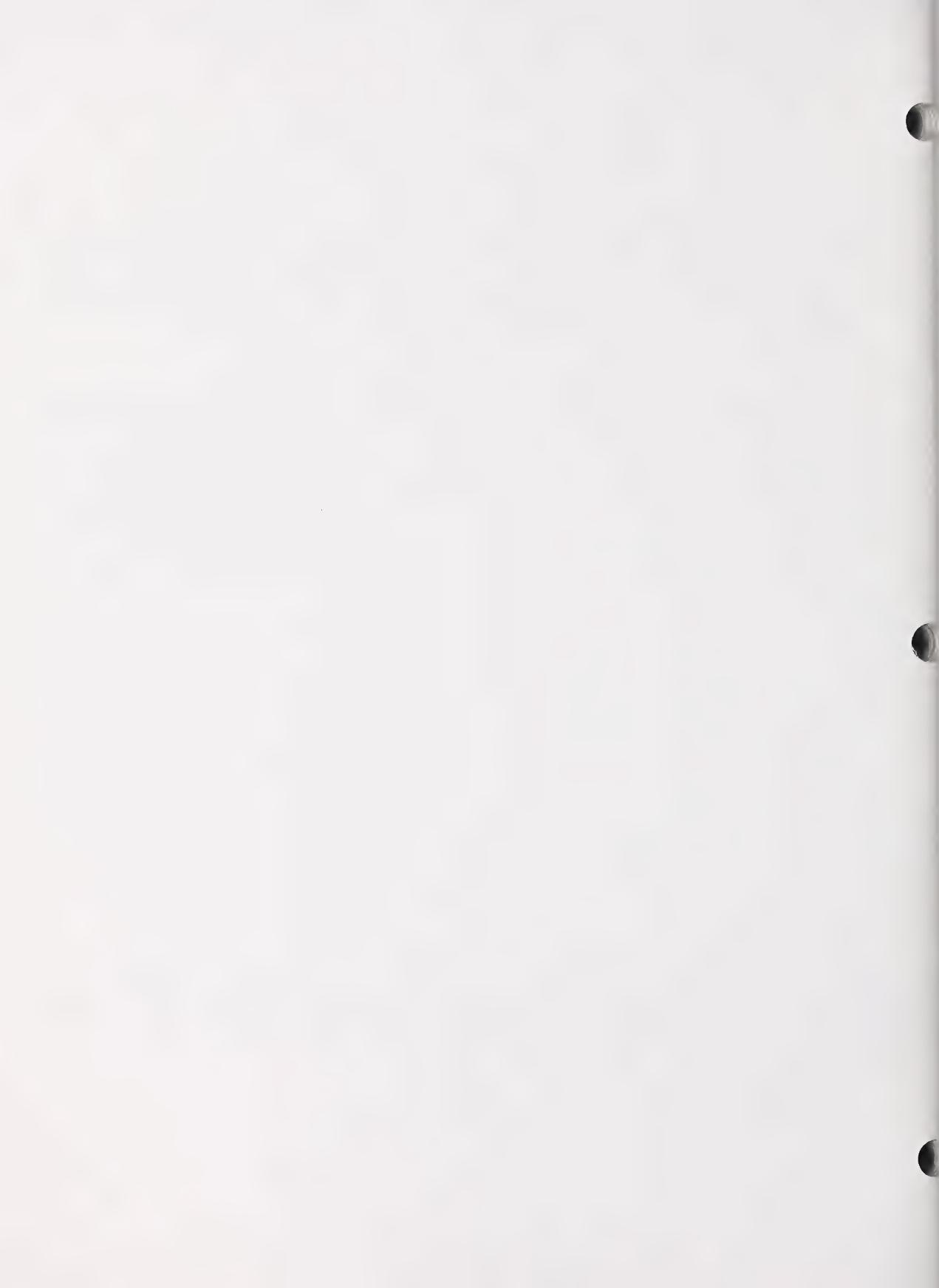
4. **Look for a Pattern:** In this strategy, the student identifies a pattern in actions, sounds, pictures, or numbers.

12 12 12 12



## Geometric Shapes





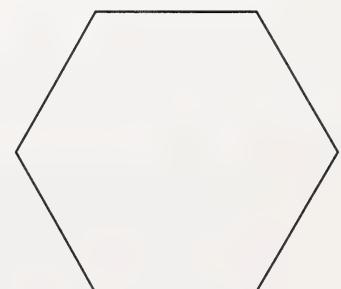
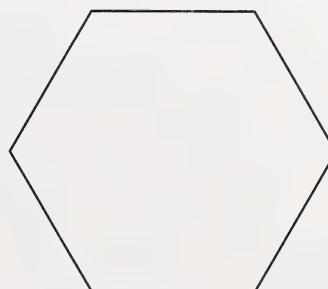
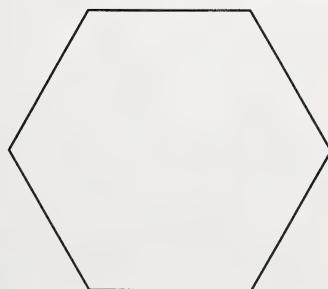
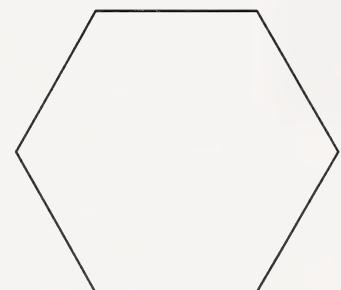
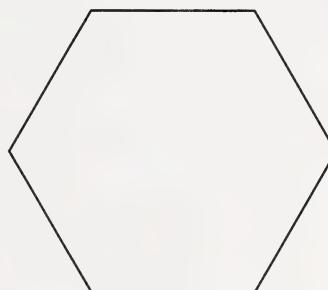
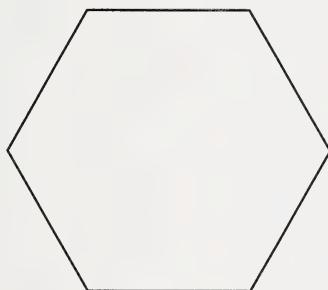
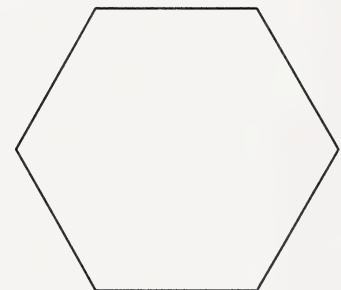
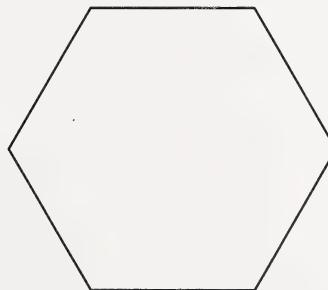
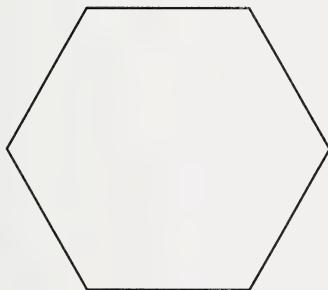
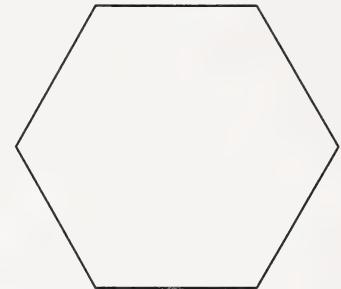
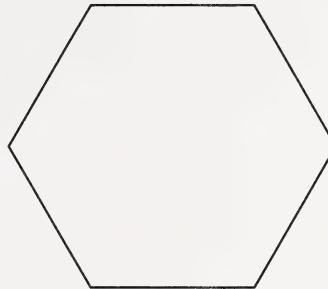
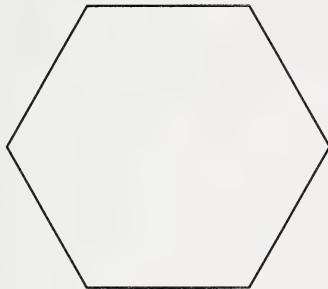
Hundred Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



## Pattern Blocks – hexagon

You or the student could colour these shapes **yellow**. Then carefully cut out each shape, and use the shapes as directed in module activities.

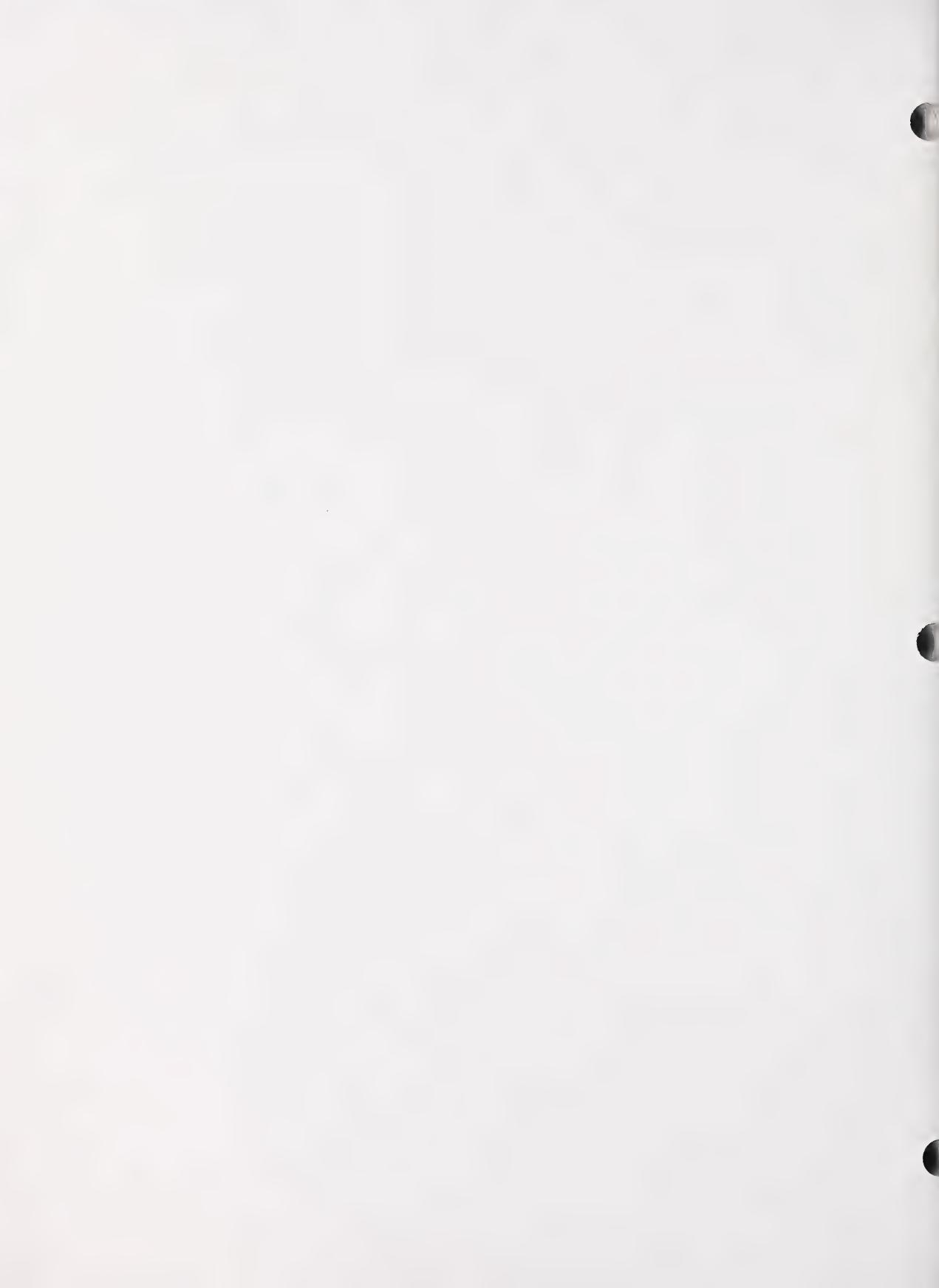




## Pattern Blocks – triangle

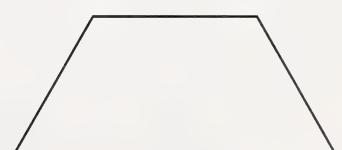
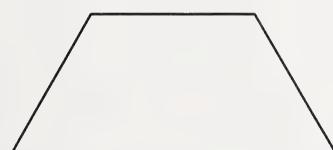
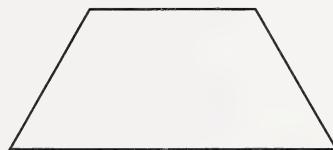
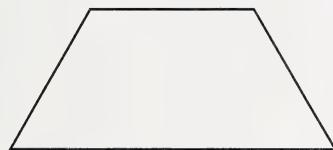
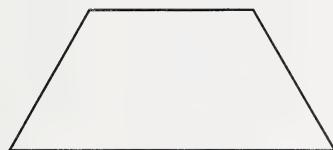
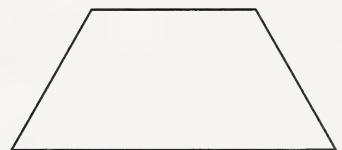
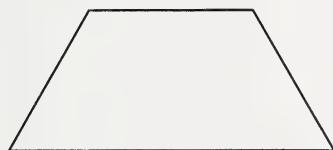
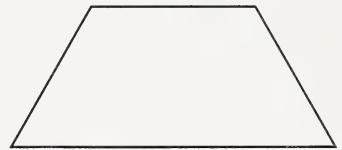
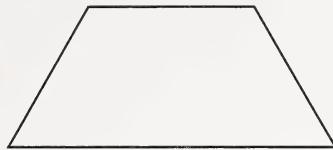
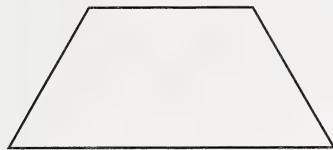
You or the student could colour these shapes **green**. Then carefully cut out each shape, and use the shapes as directed in module activities.





## Pattern Blocks – trapezoid

You or the student could colour these shapes **red**. Then carefully cut out each shape, and use the shapes as directed in module activities.





## Pattern Blocks - large diamond

You or the student could colour these shapes **blue**. Then carefully cut out each shape, and use the shapes as directed in module activities.





## Pattern Blocks – small diamond

You or the student could colour these shapes **brown**. Then carefully cut out each shape, and use the shapes as directed in module activities.





## Pattern Blocks – square

You or the student could colour these shapes **orange**. Then carefully cut out each shape, and use the shapes as directed in module activities.

